An Expanding Root Canal Filling.

By George Bailey Harris, D.D.S., Sc.M.

Experiments made by the author in the Research Laboratories of Parke, Davis & Co.

A root canal filling, to prove beneficial and successful for what it is intended must fulfill certain conditions, some of which are as follows:

1. It should be non-contracting, or, if it must contract, the contraction should occur in the centre of the filling, and not from the side of the filling toward the centre. In other words, the canal filling should adhere to the walls to such an extent that when contraction takes place it will be from the centre of the filling toward the walls of the canal.

2. The filling should be mildly antiseptic during its plastic state and have solidification take place slowly.

3. Upon drying, it must not be reduced to a powder, leaving the canal less than half filled.

4. It should be removable.

5. It should be non-irritating.

6. It should prevent the passage of the Roentgen ray.

Were these points applied to the root-canal fillings now being used, we would find one or more of these conditions not fulfilled.

Chloro-percha.

Chloro-percha, which is used more than any other substance for this purpose, is not immune. It does not prevent the penetration of the rays and it contracts upon drying. It will not contract from the

canal wall if the wall is perfectly dry, but it will not adhere to it if there is the least bit of moisture in the canal. This results in an incomplete or partially filled canal.

This is overcome to a certain extent by the use of the gutta-percha point, but the point must go to the end of the root to do this. Radiographers show time and again that the point does not reach anywhere near the apex of the root in a great many cases where such a procedure would seem to be a simple matter. Again, chloro-percha does not readily follow the canal, having a tendency to form a ball when placed in the canal, due to the rapid evaporation of the chloroform. This is overcome to a certain extent by the use of eucalyptol, or like substance; but experiments show that this is far too irritating to be used in root-canal fillings. The X-rays pass through chloro-percha, making diagnosis by this means extremely difficult.

Paraffin.

The case of paraffin is somewhat different. Here we encounter the contraction from the wall toward to centre and more or less difficulty in getting it to the apex of the root due to its rapid solidification. It does not hold back the X-rays nor can it be made antiseptic, so that it will remain so after solidification.

The Author's Experiments.

Bearing these facts in mind, we set out to produce a substance that would remove as many of these objections as possible, and we believe we have at least partially succeeded. In the first place we have a substance that will expand upon solidifying, instead of contracting. To the liquid is added a "binder" that will not permit its return to a powder upon drying out.

This preparation consists of a powder and a liquid. When these two are mixed together a chemical reaction takes place which results in the expansion of the paste, for it is a paste.

Now, when the paste is stirred rapidly, a contraction results. When the paste in this state is sealed in a pulp chamber it again expands to the chemical reaction which again takes place and which is exaggerated by the rise in temperature. The rise in temperature causes it to take on a semi-solid form, which can be hardened at once by the addition of one drop of another liquid to the canal contents. If this is not added the filling will harden in about two weeks.

At first it was considered necessary to seal up the apex of the root to prevent the expanding paste from passing through the apex, and a great deal of time was devoted to solving this, the final decision being that the best substance for the purpose is a triple salt of tin, made by passing chlorine gas through tin chloride.

After studying the expansion, we found that it could be easily and absolutely controlled; that the expansive power could be eliminated entirely on the one hand or it could be made to expand to such an extent that it would force out a gutta-percha plug when the "normal" or a little above "normal" expansion was placed against resistance equal to that which it would encounter in a root having a foramen of the diameter of ½ mm. Under these conditions it was found that the expansion was not so great as the tissue pressure or resistance outside of the apex of the root, and that the paste would not pass through unless all expansion possible to put into the paste were used, and it is possible to get considerable more pressure outside the mouth than in, due to a lower temperature at which the experiments may be carried on. For this reason we find that lining the canal and sealing up of the apical foramen are unnecessary, except in deciduous teeth, where we believe that an expanding canal filling is both contra-indicated and unnecessary.

There are several ways by which the expansion of this material may be controlled. The most important one is the temperature at which it is mixed and the temperature at which it is introduced into the root canal. If it be mixed at the temperature of the body, there will be neither expansion nor contraction; above that temperature, contraction will take place, and below, expansion. The higher above the normal temperature of the body it is mixed the greater will be the contraction, and the lower the temperature, the greater will be the expansion. So sensitive is it to heat and cold that a fraction of a degree will show a decided difference in its behavior in regard to the expansion or contraction in or out of the canal. Another consideration is the time elapsing between its introduction into the canal and the sealing of the canal. This would effect the expansion only. As soon as it is introduced into the canal, either expansion or contraction begins, unless it is introduced at exactly the temperature of the canal. Expansion will take place along the lines of least resistance, and if the canal is not sealed it will expand out. The more quickly it is sealed in the greater will be the expansion, and where no expansion is desired it is only necessary to leave the canal open for from five to ten minutes, to allow all expansion to take place, then sealing it up. There will then be no pressure in the canal and the filling will not be dense. Should it then be found desirous to expand it, or to condense it a little, all that would be required would be the addition of one or two drops of liquid introduced into the canal at a low temperature and quickly sealed with cement. Expansion and condensation will then take place in a very few minutes. The density of the filling will be governed by the quantity of the powder added to the liquid as well as the temperature. The more powder used, the slower will be the expansion, the denser the filling and

the less the expansion. However, by the addition of all the powder possible to add to the liquid, the expansion cannot be prevented entirely.

Tube Experiments with Expanding Root Filling.

Where contraction takes place it contracts in the centre. This is shown in Fig. 1, tube 2. This tube was filled up to F and then gently warmed until it expanded to R. It was then allowed to cool. Contraction occurred, not at the side of the tube, but in the centre of the filling downward and toward the sides of the tube to N, the remainder being solid. The distance from F to N represents the extent of normal expansion contained in the paste at the temperature it was mixed and at

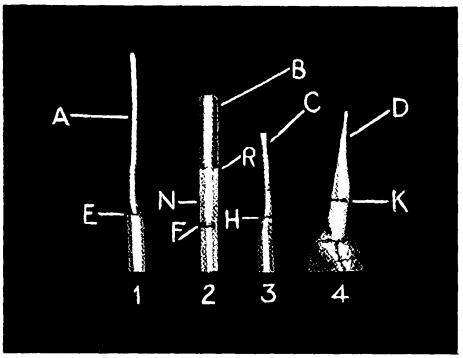


Fig. 1.

room temperature. An alcohol flame was then applied below F and expansion again took place, expanding to B. Were this temperature maintained until solidification occurred no contraction would result, but as the flame was withdrawn as soon as B was reached, contraction took place, finally returning to the same level where it was before the alcohol flame was applied. As this tube is of the same diameter throughout its full length, the paste was expanded more than its own volume and maintained it throughout solidification. To show how sensitive it is to thermal changes, we will consider tubes 3 and 4 in the same illustration. In these two cases the paste was prepared at room temperature and put into the two tubes at the same temperature. No heat was applied from outside sources, *i. e.*, all the heat involved in producing the expansion was the result of the chemical reaction which took place as a result of the powder and liquid being mixed together. As a matter of fact, the rise in temperature is so slight that it is detected with difficulty; yet this small change is sufficient to cause the mixture to expand from H to C in No. 3 and from K to D in No. 4.

Were the paste allowed to dry and then be pulverized and have the liquid again added, while it would expand under certain conditions, its extreme sensitiveness would be lost, but there would still remain sufficient expansive powder to fill a reasonable space. Its response, however, would be slower.

In the experiments shown so far, all the tubes have been open at one end, allowing the air between the paste and the end of the tube to escape as expansion took place. This condition does not exist in a root canal. What then becomes of this air in the canal? Is it forced beyond the apex of the root into the surrounding tissues, or will it prevent expansion? It is not forced beyond the apex, because the same amount of pressure preventing the paste to expand beyond the apex also prevents the air from passing beyond. Again, it does not prevent expansion.

Tube No. 1 shows the expansion taking place in a sealed tube quite as readily as it does in the open tubes. This tube was filled and the filling expanded under the same conditions as were Nos. 3 and 4, the air offering no resistance whatever. The air is taken up by the paste as it expands, filling the microscopal spaces produced when the molecules swell during the expansion, and there it remains. Whether any of the air is chemically taken up by the paste or not has not yet been determined, but it likely is not.

Possibility of Removal of Root Filling.

The next consideration is its removal from the canal, should this become necessary. Let us suppose that complete solidification has taken place and that the filling is perfectly hard. Its removal is an easy matter. Simply open up into the pulp chamber and then chill the tooth with ice or a cold blast of air and fill the canal with the expanding liquid, previously chilled. This will be rapidly taken up by the filling when another drop is added, keeping both the liquid and tooth as cold as possible. Remove the ice or cold blast and either apply a warm blast or allow it to be warmed from the tissues. In a few minutes it will again expand, following the line of least resistance, which in this case will be toward the crown of the tooth. In other words it will expand outwardly. Additional liquid can then be carried on a broach and the entire filling removed without any danger of forcing it through the foramen and without the slightest discomfort to the patient. The operation is also very quickly done.

Resistance to X-ray.

An important feature which this material possesses is its ability to stop the Roentgen ray. This was overlooked in the original powder and was suggested to me by Dr. Giffin, of Detroit, who pointed out its extreme importance, and after considerable experimenting we were

able to add this factor to the material without interfering with any of the other points. Supposing that we fill a root canal, or, better, fill two root canals in a molar tooth, but are unable to get into the third for some reason. The chances are that this third root will be completely filled by the expanding, but we would not be sure. An X-ray would tell this at once, and in case it was not completely filled all that would be required would be the addition of a little liquid, resulting in a continued expansion. This operation would be continued until the radiograph showed all the canals completely filled. This can be done in third molars by simply filling the pulp chamber half full of the paste, filling the balance with cement and allowing the expansion to fill the canals.

The Practical Application of our Knowledge of the Resorption of the Roots of Permanent Teeth.

By Rodrigues Ottolengui, M.D.S., D.D.S., LL.D., New York.

Read before the American Society of Orthodontists at Toronto, July, 1914.

Last year it was my privilege to call the attention of our members to the fact that roots of the permanent teeth, notably the incisors, may be resorbed, the phenomenon very much resembling the normal physiological shortening of the temporary teeth, especially as in both instances the pulps remain alive.

In the course of my communication of last year I described and illustrated various types of root destruction, dividing these into physiological and pathological. In regard to this I said:

"By physiological resorption I mean that resorption of a root which occurs as a part of the normal routine, as when the roots of deciduous teeth resorb to accommodate the erupting successor. There is one marked clinical fact to be noted in regard to physiological resorption, and that is that the pulp of the deciduous tooth, though shortened with the root, remains alive.

"By pathological resorption I mean a resorption inaugurated by some outside interference with the normal routine. There are several distinct kinds of pathological resorption, which are accompanied by clinical aspects, which are fairly constant when studied with the X-ray."*

As examples of pathological resorption I exhibited radiographs of roots shortened as a result of alveolar abscess, and in another instance due to the presence of an extensive tumor. I mentioned that I had known of cases where erupting third molars had caused resorption of the distal surfaces of second molars, but at that time I had no case which I could

*Items of Interest, May, 1914, page 335.

show. Through the courtesy of Dr. Theodore Blum, I am now able to give you the pictures and clinical history of such a case.

Pathological Resorption.

The patient had reported excessive pain in the third molar region and was referred by his dentist to Dr. Blum for a radiographic diagnosis. Fig. 1 shows the radiograph in which the impacted third molar appears to be impinging upon the distal side of the second molar.

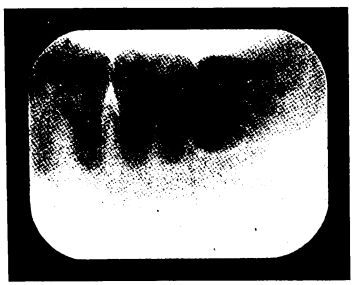


Fig. 1. (Theo. Blum)

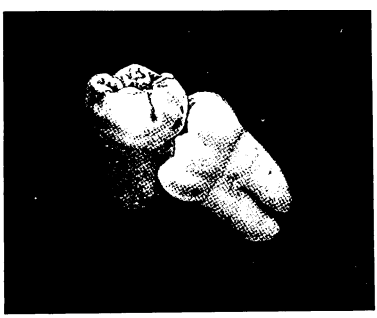


Fig. 2.

Fig. 3.

It is, of course, to be recognized that the actual positions of teeth as seemingly disclosed by radiography, may be more or less deceptive. It is very doubtful that there was any actual contact between these teeth I allude to this particular point, because last year I said that this type of root destruction may be called "traumatic." By traumatic we usually conceive the idea of an injury resulting from a blow, and, of course, a third molar cannot strike a second molar, as a hammer strikes a nail. But I take it that an injury following an actual blow is not a result of the impact of the striking object, but is rather due to morbid processes

set up by the force exerted by the blow. Thus if a man have his fingers crushed between two rollers in a rolling mill, the injury can as properly be called traumatic, as where they are crushed by a falling heavy weight. Similarly, I think, we may consider the destruction of one tooth root by the forces of eruption of an approaching tooth to be traumatic in character, quite as appropriately as where the root destruction follows an actual blow.

I think, therefore, that in the case of the molars in question, we need not look for actual contact, to account for the resorption of the stationary tooth, but we may believe that the destruction is due to morbid processes set up in the path of the moving tooth. It is singular, however, and must have some clinical significance, that the destroyed area seems to assume the exact form of the approaching tooth surface.

Dr. Blum's diagnosis was that the approaching third molar had caused resorption of the second, to an extent involving the pulp, thus accounting for the neuralgic pain. Both teeth were extracted, and in Fig. 2 I show them to you placed in contact, to indicate how closely the destroyed area in the second molar matches the shape of the cusps of the third. In Fig. 3 we see the distal surface of the second molar, and the extent of the resorption.

Resorption of Implanted Teeth.

The subject of tooth implantation is one that should very greatly interest the orthodontist. If this operation could be safely conducted it would solve many problems for us. Unfortunately, the length of time which may be reasonably counted upon for the retention of an implanted tooth is so problematical, that the operation is a questionable procedure.

It has heretofore been my belief that the eventual loss of the implanted teeth is due to some traumatic injury. There is little doubt that any extra impact, whether from an actual blow, or by biting through some hard substance and thus suddenly bringing the incisive edge of the implanted member against that of its antagonist, might excite an active osteoclastic action which would rapidly destroy the root. With the evidence that I am about to submit I must add to this theory the view, that implanted teeth are constantly receiving traumatic blows, slight in degree of stress perhaps, but destructive in their effects, because of the fact that, the implanted tooth having no periosteal cushion to protect it, is unprepared to resist the forces of mastication. Under such circumstances the implanted root is constantly and progressively resorbed till lost.

Fig. 4 is a radiograph, taken June 19, 1913, and was shown last year. This tooth had been accidentally removed from its socket, and

because of the youth of the patient, I recommended replantation, and with the consent of the dentist and of the child's parents, I performed the operation about one year prior to the making of this radiograph. I would once more call attention to the difference in appearance of this root and

Fig. 4. (Ottolengui)

Fig. 5. (Ottolengui)

Fig. 6. (Ottolengui)

Fig. 7. (Ottolengui)

the adjacent roots. I believe that sound roots cast more distant shadows because of the presence of the cementum, and that when this is wholly or partly lost by resorption, as in the case of implanted teeth, we have a lessened resistance to the ray, and a consequent reticulated appearance.

Fig. 5 is a radiograph of the same tooth taken May 2, 1914, and I think proves conclusively that the resorption of this root has been progressive, and that consequently the future of the operation is most discouraging.

Fig. 6 was also shown last year. It was taken on March 4, 1913, about two years after the tooth had been replanted by another practitioner. The attachment of the root through osteoclastic resorption fol-

lowed by the building in of new bone is well shown. Quite by accident the apex of the adjacent lateral incisor appears in the field and seems to be intact and fully formed.

Fig. 7, a radiograph of the same case taken March 12, 1914, shows that here again the resorption of the central incisor root has been progressive, and that prognosis predicates a final loss. But of still greater

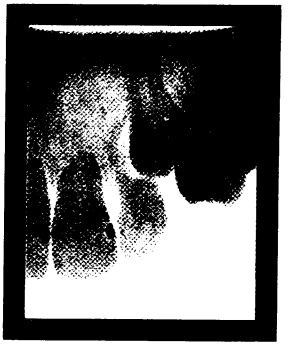


Fig. 8. (Schamberg)

Fig. 9. (Ottolengui)

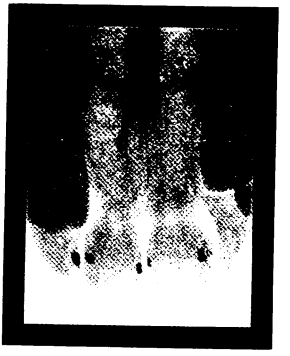


Fig. 10. (Schamberg)

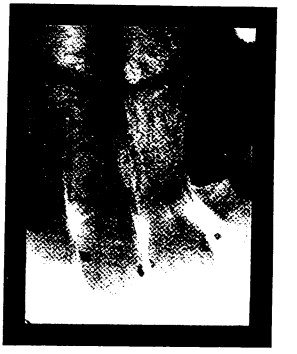


Fig. 11. (Ottolengui)

interest is the apparent shortening of the lateral incisor by resorption. The loss is slight, and may be doubted by some. But I have three radiographs taken at varying times from March 12 to May 7, and in all the apex of the lateral seems to have suffered. However, it will be interesting if possible to obtain radiographs again a year from now. Indeed, it would be most instructive if we might have annual radiographic records of a large number of implanted or replanted teeth, and those who still have confidence in the operation would be serving science and future patients by having such records made.

In the discussion last year Dr. Dewey, speaking of the resorption of living permanent teeth, said, "It would be interesting to find out in these cases whether the resorption stops or progresses until the whole tooth is lost." In the case from my own practice reported last year, I recorded the fact that on the left side the lateral incisor was finally lost, or rather extracted, because of the eruption of the cuspid. The root of this lateral had entirely disappeared. The condition in the region of the central incisors, and of the right lateral and cuspid, however, may have some clinical significance.

Fig. 8 is a radiograph showing right lateral incisor, and also the right central and cuspid, taken by Dr. Schamberg October, 1910, which may be compared with Fig. 9, a radiograph taken by the writer on April 25, 1914. Fig. 10 shows a radiograph of the centrals taken by Dr. Schamberg in October, 1910, and Fig. 11 shows a radiograph taken by the writer in April, 1914. Here we find that the cuspid has advanced very little, and while the lateral root is a little shorter, the centrals seems to be about the same. It is noteworthy that these teeth are somewhat protected from the stresses of mastication, owing to the fact that they are in infra-occlusion to such an extent that they cannot be made to touch the lower incisors.

Before proceeding to the consideration of my actual text, I beg the privilege of recording a few more cases of root resorption which have been brought to my notice during the current year.

Dr. Ketcham's Case.

The following history, accompanied by radiographs was sent to me by Dr. A. H. Ketcham, for an opinion.

"The patient is a lady, thirty years of age; temporary cuspid root had been crowned, over which is a chronic alveolar abscess. She was sent to me for diagnosis by the means of the X-ray. At the first sitting I made two exposures (Figs. 12 and 13), which show the impacted cuspid and the apex of the central incisor root apparently lying posterior to the crown of the cuspid, and, apparently, absorption of the lateral incisor root end. I hesitated about making a positive diagnosis without further radiographs, so made the two exposures seen in Figs. 14 and 15. These show that there is a layer of bone between the apparently absorbed lateral incisor root and the cuspid, forming the cuspid crypt. Then I remembered having made radiographs of a case—a lady of mature years—in which a bicuspid had apparently run against the hard floor of the antrum and stopped forming instead of following its usual course and perforating the floor of the antrum. This is illustrated by Figs. 16 and 17, made from two films which were placed face to face in a package for exposure.

"So the question has arisen in my mind, is it not possible in rare instances that a tooth root when forming, upon pressing against a hard substance like the dense bone forming the crypt of a tooth, or the floor

Fig. 12. (Ketcham)

Fig. 13. (Ketcham)

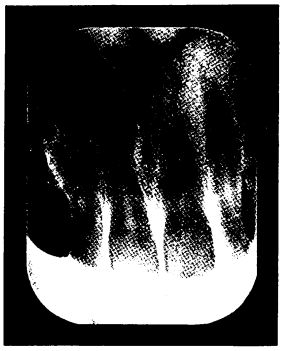


Fig. 14. (Ketcham)

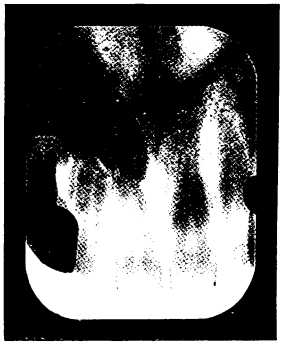


Fig. 15. (Ketcham)

Fig. 16. (Ketcham)

Fig. 17. (Ketcham)

of the antrum, may be arrested in growth and instead of showing absorption of the roots, the radiographs show arrested development?"

This case differs from any so far reported because we have the erupting cuspid, as in other case, but likewise we have an extensive alveolar abscess on an adjacent root, so that the lateral seems, as it were, to have been "between the devil and the deep sea." Believing that something might be determined by the condition of the pulp, I wrote and asked whether or not the pulp in the lateral had died. Dr. Ketcham replied as follows: "Dr. Howell tested the lateral incisor having the resorbed root end, and without knowing his conclusions I tested it. Our diagnosis is vital pulp." From this fact it is my view that the destruction of this root has not been caused by the nearby alveolar abscess. The clinical picture is different also, because where resorption results from an infectious condition, we find the alveolus itself likewise resorbed, whereas in this case it is intact close to the resorbed end of the lateral root, thus resembling physiological resorption of temporary teeth.

Dr. Howell's Case.

At the request of Dr. Ketcham, Dr. J. L. Howell, of Denver, has kindly sent me the following history. Unfortunately the radiographs could not be found.

"Miss Margaret McDonald, aged nineteen, when twelve years old had her left temporary upper cuspid knocked out by a blow in the mouth.

"The left lateral evidently moved back in the place of the cuspid.

"When the patient applied for treatment the left central was very loose: owing to the fact that she had had a blow in the mouth several years before, I assumed that the central had been fractured at the same time.

"On opening into the pulp chamber, I found the pulp alive, and after removing the pulp I discovered no root to the central, no more than in a deciduous tooth that is almost ready to come out.

"I also discovered a hard substance which proved to be the cusp of the cuspid."

Dr. Hoffman's Case.

At the request of Dr. Ketcham, Dr. Henry F. Hoffman, of Denver, sent me the following history:

"Dr. Ketcham tells me that you desire data concerning the absorption of the roots of permanent teeth, and requests me to report to you a case which occurred in my practice.

"February, 1898, Miss H., age 13 or 14, presented with the upper left permanent cuspid almost fully erupted labial to and in contact with the lateral incisor, the buccal teeth having moved mesially sufficiently to nearly close the space for the cuspid.

"Examination disclosed what seemed to be a cervical cavity on the labial side of the lateral incisor just beneath the margin of the gum, on the surface in contact with the cuspid. With the intention of filling

this cavity before any other treatment was instituted the teeth were slightly separated and the cavity packed to force the gum tissue out. After doing this, no cervical wall could be found to the cavity and the case was considered one of absorption rather than caries. The tooth was extracted and the entire labial side of the lateral incisor root from the junction of the cementum with the enamel to the apex, was found to be absorbed, and the pulp exposed for nearly the entire length of the root.

Fig. 18. (Ottolengui)

Fig. 20. (Satterlee)

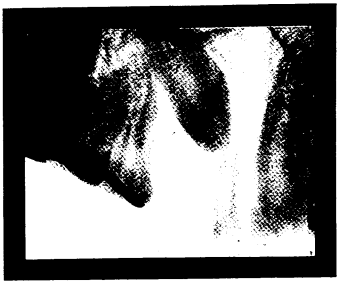


Fig. 19. (Satterlee)*

The pulp was vital at the time of extraction, and the patient had experienced no pain from it. The cuspid root showed no signs of absorption and subsequently assumed, without aid, the position of the lateral incisor.

"Unfortunately the extracted tooth and models were lost, but the case was seen by Dr. W. T. Chambers and Dr. J. S. Jackson, both of this city."

This history is most interesting, because of the fact that the cuspid erupted completely, without pain and without destroying the vitality of the pulp of the lateral, in which respect the clinical symptoms are quite different from what seems to occur in the third molar region, where we always hear of pain, either due to impingement upon the vital pulp of the second molar, or else from the death of that pulp.

*This seems to have been printed with film reversed.—Ed.

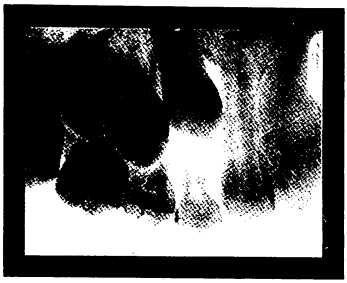


Fig. 21. (Ottolengui)

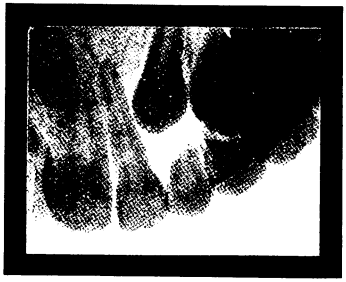


Fig. 22. (Ottolengui)

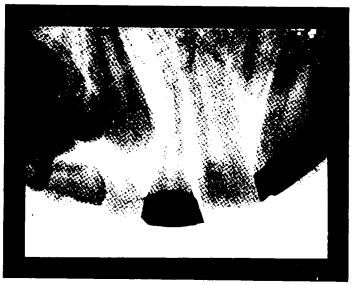


Fig. 23. (Ottolengui)

Fig. 24. (Ottolengui)

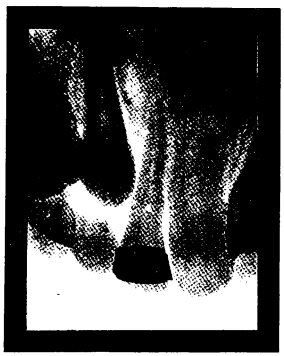


Fig. 25. (Ottolengui)

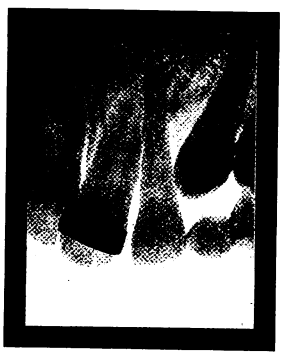


Fig. 26. (Ottolengui)

Dr. Waldron's Case.

Dr. Ralph Waldron, of Newark, N. J., brought one of his patients to me and permitted me to take the radiograph shown in Fig. 18, in which we find an erupting cuspid, and a lateral incisor root from which the apex appears to have been lost by resorption. As the case had been under treatment, I asked whether any radiographs had been previously made and he finally obtained the following from the radiographer who had made the exposures. Fig. 19 is undated, and the film clearly shows resorption at the end of the lateral incisor. Fig. 20, taken March 20, 1913, prior to the inauguration of any orthodontic interference, is somewhat difficult to read, but probably shows that the lateral root had not been fully formed at that time. In passing I should report that here, again, the pulp remains alive.

Practical Application.

We arrive at last at a discussion of the practical value of this information, collected from the records of a number of men, in which we learn at least that the apex of a lateral root may be resorbed coincidently with the eruption of the permanent cuspid; and secondly, that the central incisors, though not in the path of the cuspid, may suffer similarly. From this latter fact, somewhat emphasized by the record of the implanted tooth case where we find that the lateral root has lost its apex, I think we may conclude that an osteoclastic action once inaugurated about one tooth, may spread and cause injury to an adjacent member.

Consequently, it would seem wise, in cases of early treatment, first to obtain radiographic information as to the locality and stage of development of unerupted teeth. This will not only aid in determining the plan of treatment, but might serve as a protection in case of untoward occurrences.

Much as patients may desire rapid progress, I believe that they will appreciate conservative slowness which is adopted as a precautionary measure. In evidence of which I wish to report two cases.

Cases from Practice. Case 1.

In June, 1913, I had been treating a patient whose four upper incisors flared labially, being widely converging at their incisive ends, and apparently in close contiguity at their apices. I had reduced the coronal portions as much as possible without moving the roots apart, and as a working retainer, I placed bands on the four incisors, carrying vertical tubes. I used a labial arch, with vertical pins. These were not Angle appliances, both tubes and pins being larger. By slightly bending the arch at the median line, and then forcing the pins into the tubes, the appliance had the tendency to separate

the teeth at their apices. As the patient was to be absent four months, this bending of the arch was not made very extreme, for which I was subsequently grateful.

In October last, when I saw the patient again, I found that the central incisors had assumed a fairly erect position, but the lateral crowns were still converging distally.

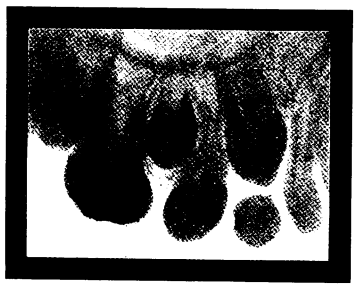


Fig. 27. (Ottolengui)

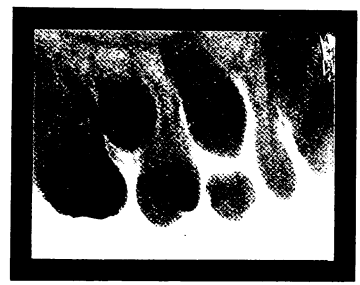


Fig. 28. (Ottolengui)

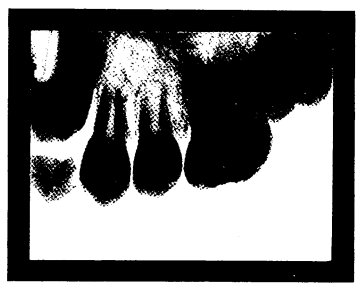


Fig. 29. (Ottolengui)

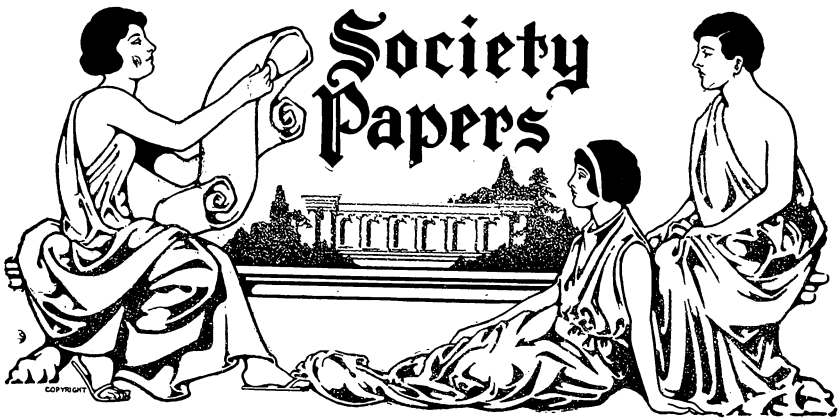
Having in the meantime presented my paper on this subject, it occurred to me that it might be well to radiograph the case. Figs. 21 and 22 show the condition and position of the laterals and cuspids right and left. These were made October 4, 1913. From a study of these radiographs, and especially that of the right side, I decided that it would be hazardous to attempt any distal movement of the lateral roots, and by explaining matters fully to the mother my course of "watch and wait" so far as this particular region was concerned, was heartily approved.

I used the new Angle appliance, with bands on the central incisors, with which I further improved the position of these teeth, by moving the apices labially, thus slightly enlarging the apical arch. Sometime in February, 1914, I deemed it safe to engage the left lateral and I transferred the band from the left central to the left lateral, slowly and carefully drawing the lateral mesially, without, however, attempting to move its root distally.

On May 9, 1914, as both cuspids were evidently approaching eruption, I made the radiographs seen in Figs. 23 and 24, made in this manner to match those made in October, 1913. I also made the radiographs shown in Figs. 25 and 26, and from a study of these I deemed it safe to remove the band from the right central, and to band in its stead, the right lateral, and then proceed to draw the lateral crown toward the central, closing the space between it and the central. At the present time all four teeth are in satisfactory position, and while no risk might have been run in moving the laterals earlier, certainly no harm, and some possible advantage has been gained by waiting.

Case II. In another case a girl aged nine was brought to me for examination. An upper second temporary molar had been prematurely lost and the first permanent molar had drifted mesially. I radiographed the case to determine whether or not the second bicuspid were present.

In Fig. 27 we see that the second bicuspid is in the bone, but has very little root. We note also that the first bicuspid apparently has little root, and we observe that both the cuspid and the second bicuspid appear to be crowding down upon it. In an attempt to get a better view of the root of the first bicuspid, a radiograph at a different angle was made and is shown in Fig. 28. Several other exposures have been made at different times, but it seems impossible to obtain any more definite information as to the exact length or stage of development of this tooth. Fig. 29 shows the bicuspids of the opposite side for comparison, and we observe that though the bicuspid crowns are fully erupted, the root development is not far advanced. A study of this case by the models alone, and treatment based thereon, would indicate the need of immediate interference to move the drifted first molar distally in order to give room for the impacted second bicuspid. But a study of Fig. 27 shows us that the unerupted second molar lies in just such a position relatively, as was seen in Fig. 1, where we saw a third molar erupting against the second. Any forcing of this first molar backward against the second would, in my view, possibly inaugurate resorption of the distal surface of the first molar. Believing, therefore, that it would be safer to undertake this a few months later, by which time the second molar crown may have advanced sufficiently to bring its enamel surface against the enamel of the first molar, and also considering that further development of the first bicuspid root might render operations in that region safer, I have advised delaying work until next autumn. Perhaps I am unnecessarily cautious, but I believe in the soundness of my position in these two cases. And while I still am an advocate of early treatment, I am of the opinion that such treatment will be more wisely and successfully administered if checked up and guided by radiography.



Desensitizing Paste.

A New, Safe and Reliable Remedy for Hypersensitive Dentin.

By J. P. Buckley, Ph.G., D.D.S., Chicago.

Read before the Second District Dental Society of the State of New York, October, 1914.

In the early history of civilization, we find that the possession of the cardinal virtue of fortitude was considered a mark of courage, strength and character, because it enabled the individual to willingly undergo the necessary pain, peril or danger incident to life. But the discovery of anesthesia by humanity's greatest benefactor, Horace Wells, the dentist, together with the humanitarian tendencies of the years, have so changed human nature that we find few people to-day who possess the spirit of fortitude as manifested in ancient times to any marked degree. Among other things in life, this condition of affairs demands more painless methods of practicing dentistry. The one dental operation which has caused more pain in the past than all others combined is that of the preparation of cavities in vital teeth.

Ever since the art of filling teeth was first begun both the dentist and patient have cherished the ardent hope that some day it would be possible to perform this operation without pain. Especially is this true in these modern times, when to carry out the basic principles of cavity preparation, as understood to-day, it is necessary for the cavity to have a flat seat with practically parallel walls; that it should possess resistance, retention and convenience form, and that the outline be carried to areas of immunity—all of which requires drilling into sound and usually extremely sensitive dentin.

Sensitiveness of Dentin.

Authorities differ in regard to the sensitivity of dentin. Some claim that normal dentin is without sensation; while others assert, with equal authority, that all vital dentin is sensitive. Black differentiates between hypersensitiveness and thermal sensitiveness of dentin, claiming that the sharp pain caused by sudden changes of temperature is normal, though no other tissue or organ of the body shows a like resistance to thermal changes. Under certain conditions hypersensitiveness to thermal changes may develop, when the condition becomes pathologic. In so far as the therapeutics of hypersensitive dentin is concerned it matters little whether normal dentin is sensitive or not, for clinical experience teaches us that thermal sensitiveness as well as hypersensitiveness of dentin often develops during the progress of decay; therefore, in the preparation of a cavity for filling we find few teeth in which the dentin is not sensitive. The degree of sensitivity differs markedly in individuals and in the same individual at different times.

Previous Attempts at Controlling Pain.

For years men of all classes, from the conscientious practitioner to the charlatan and quack, have endeavored to invent means or discover remedies for the elimination of pain caused by operations upon vital teeth. In 1836 Dr. Spooner, of Montreal, thought he had made the discovery when he introduced arsenic trioxid as a remedy for desensitizing dentin. In more recent years cataphoresis, high pressure injection of cocain, interosseous and conductive anesthesia have had their advocates. All kinds of local remedies have been suggested. General analgesia by chloroform and nitrous oxid has long been used by a limited number. Later, analgesia by somnoform or nitrous oxid and oxygen has been revived. Many are using these various agents to-day with more or less success—not because they are in full sympathy with the methods or means, but because they seem to be forced to use something; and their patients are willing to submit to almost any process if pain can be avoided.

Any method or remedy for the elimination of pain in filling teeth, which necessitates placing the tooth or patient in such condition that the dentin can be painlessly drilled to any depth, is a dangerous one to place in the hands of the profession in general. Pain is Nature's indicator, and pain should be our guide. I have been of the opinion for years that the ideal method of desensitizing dentin would be the application of a remedy within the cavity which would affect the dentin only to a given depth, and thereby not reached nor affect the pulp. I was somewhere near the truth when in 1909 I stated. in my book on "*Modern Dental*

Materia Medica, Pharmacology and Therapeutics," after discussing the use of escharotics for obtunding sensitive dentin and taking up *"Local Anodynes or Local Anesthetics,"* that "in the judicious use of agents belonging to this class, the author firmly believes will ultimately be found the surest and safest road to success" (page 265). But where could we find such a remedy?

Some of my intimate friends and associates in the profession told me that it was my duty to discover this remedy or work out some practical formula. They endeavored to convince me that my previous training along the line of chemistry and pharmacy made it incumbent upon me to perform this task. I accepted the challenge and went to work, quietly but, nevertheless, persistently. The results I am here to-night to relate; for this hope of the dentist and patient for painless cavity preparation has now been realized.

I have the pleasure of bringing to you a new formula, which, if properly compounded from pure drugs and used with intelligence and care, will prove a boon to dentistry and a blessing to humanity.

It is a formula which has been given every test and which answers every purpose for which a remedy of this kind should be employed. It is an absolute *specific* for hypersensitive dentin, for it will never fail to desensitize the area of dentin immediately beneath the point of application, and it will do so without causing the tooth to ache, to any appreciable extent at least, and without injuring the pulp of the tooth.

Though my work has been a labor of love, it has not been easy. My problem has not been simply to desensitize dentin. This may be accomplished in many ways; but to get a remedy that is practically fool-proof—one that will densensitize the dentin without affecting the pulp—this has been the problem.

Shortly after S. S. McClure started his cheap popular magazine, in the panic of '93, he was greatly discouraged because of financial difficulties, and he made a visit to his friend, Professor Henry Drummond, at Northfield. They took long walks together; and one day, when they were off in the country, sitting on the grass, McClure told Drummond that he did not see how he could possibly pull through the task he had undertaken—that he did not feel strong enough to do it, and that he always seemed to be undertaking more than he could do. In his autobiography McClure says: "I have never forgotten Drummond's reply He said: 'Unless a man undertakes to do more than he possibly can do, he will never do all that he is capable of doing.'" I can say that many times in the last few years I have felt as though I were seeking for the impossible; but my friends encouraged me, and I am happy to say to you to-night that at last my efforts have been rewarded.

Effects of Formaldehyd on Dentin.

I have known for some time that formaldehyde would desensitize dentin, but how to control the action of the gas, and how to combine it with other compatible drugs that would modify its irritating effect, and make a stable product, has been the difficulty. It was absolutely essential that the formula should contain no arsenic, and if possible I preferred to have it contain no cocain. Yet it was necessary to use some local anesthetic agent to prevent the formaldehyde from causing the tooth to ache. Novocain is too slow in its action. The agent used here must act rapidly as soon as it is applied. Orthoform will do this, and I used it at first, only to find that it was incompatible with my essential ingredients, for a reaction gradually takes place. After months of experimenting, the pharmaceutical firm of Eli Lilly & Company came to my rescue. Their scientific department has developed a new synthetic local anesthetic, called neothesin, which answers my purpose.

Analysis of Formula of Desensitizing Paste.

The formula for Desensitizing Paste, the name which I have given the remedy, contains neothesin, thymol and trioxymethylen, in the proportion of eleven, twelve and seventy-seven parts, respectively; all combined with a petroleum base, and incorporated in a fibrous vehicle and colored with an insoluble pigment. One grain of the preparation is sufficient for about fifteen applications. On this basis the amount necessary for one application contains neothesin 1/300 grain, thymol 1/270 grain, and trioxymethylen 1/43 grain.

Neothesin.

Neothesin $(CH_3)_2N\ (C_7H_{11})\ (C_2H_5)\ OCO\ (C_6H_5)$, HCl is a new synthetic product, as stated above, possessing marked local anesthetic properties. It occurs as a white, freely soluble powder, and is rapid in its action.

Thymol.

Thymol $C_6H_3\ (CH_3)\ (OH)\ (C_3H_7)$ is a crystalline compound obtained from the volatile oil of *thymus vulgaris*. It occurs in large colorless crystals, has a characteristic odor, and is practically insoluble. It is recognized as a penetrating drug and has marked disinfectant properties.

Trioxymethylen.

Trioxymethylen $(CH_2O)_3$ is a compound formed by the polymerization of formaldehyd. It is a white powder, practically insoluble, stable at ordinary temperature, but at body temperature formaldehyd is slowly liberated.

Pharmacology of Desensitizing Paste.

It is highly essential that we understand how the desensitization is brought about when Desensitizing Paste is applied to the dentin. The neothesin applied directly to the exposed sensitive dentinal fibrillae acts quickly thereon and temporarily paralyzes the ends thus exposed. The thymol volatilizes and per-

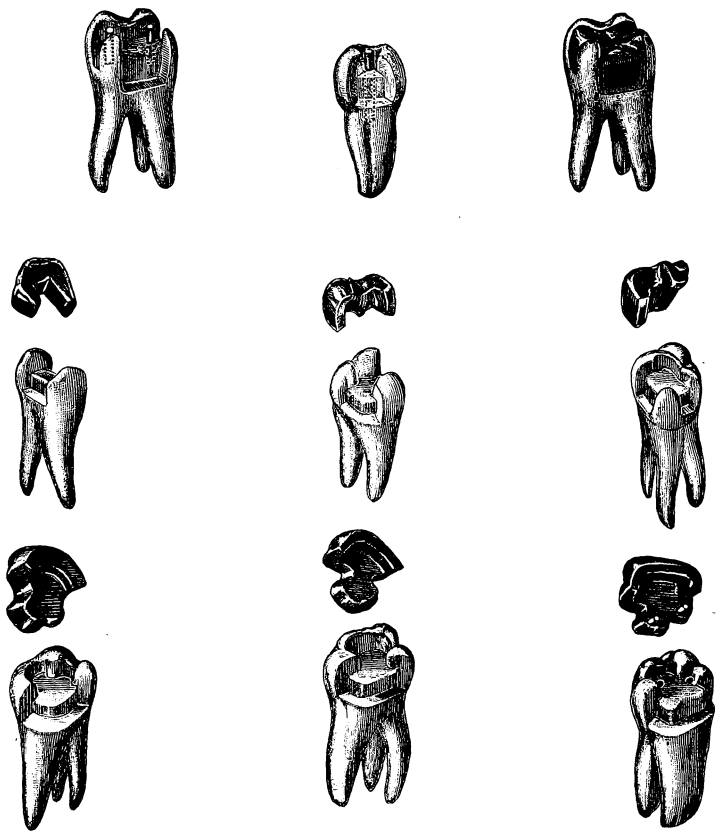


Fig. 1.

meates the softened dentin. The heat of the body gradually liberates formaldehyde from the trioxymethylen, which gas diffuses through the decayed dentin, combining chemically with the amine group of the protein constituent of the dentinal fibrillae. The formaldehyde also acts upon certain intermediate and end-products that may be present in the carious tooth-structure as a result of albuminous decomposition, and

this agent, together with the thymol, brings about *complete sterilization.* Thus the dentin affected by the remedy is not only *desensitized,* but *sterilized* as well, which is an all-important factor. The vitality of the fibrillae is destroyed in the area affected, but the remedy will not affect sound dentin to any dangerous depth. In the preparation of the cavity, in the average case, the dentin affected by the remedy is practically all removed. If it is not, I know from my experience with the paste that the vitality of the fibers is subsequently restored, for after a few weeks

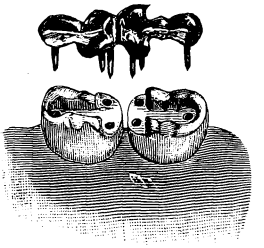


Fig. 2.

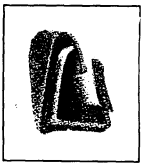


Fig. 3.

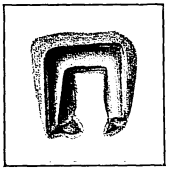


Fig. 4.

Fig. 5.

sensation returns. While this regeneration of the fibrillae is being brought about, the tooth may develop slight thermal sensitiveness which lasts for about a week. This occurs only in a small percentage of cases. I simply mention it here that the operator may know the cause and that it will be of short duration should such sensitiveness develop.

Indications for Use of Paste.

Desensitizing Paste may be used with perfect safety in all cases of hypersensitive dentin where the pulp of the tooth is not diseased to the extent of necessitating the removal of the organ because of its pathology. It is not necessary to employ the remedy in every case of cavity preparation. Where the pain is not great, and where the patient is willing to endure the small amount, no therapeutic remedy is needed; but every dentist has those cases where it is impossible to do satisfactory work because of the hypersensitiveness of the dentin. In all such cases the use of Desensitizing Paste will prove a blessing to humanity and a

God-send to those earnest practitioners who have grown gray and nervous standing at their chair trying to properly prepare cavities in the teeth of hypersensitive patients.

In his work on *"Operative Dentistry,"* Dr. G. V. Black says: "The treatment of sensitive dentin for the purpose of relieving or limiting the pain in the excavation of cavities has been prominently before the dental

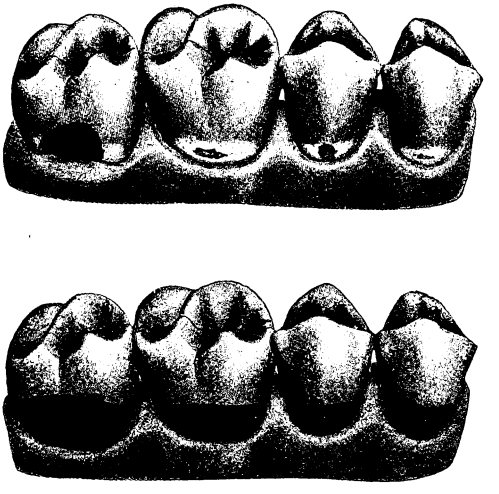


Fig. 6.

profession since the first discovery of anesthesia, and, perhaps, for many years before that time. Personally, I have watched the progress of this effort through many years of what has been fairly close, careful observation in clinical practice, and always with an earnest desire to relieve patients of suffering in the necessary cutting in the preparation of cavities. In all of this time, and up to the present, the results have been so poor, or so uncertain, that, as compared with skillful use of well-selected cutting instruments, well-tempered and always sharp, they have not been a success." The author concludes by saying: "But the relief of suffering is an ever-present duty, and the search for this very desirable thing should continue."

We can all readily appreciate that in order to practice modern dentistry and meet the demands of our patients it is absolutely necessary that we use some *real* obtunding remedy. Dr. Hart J. Goslee has long contended for certain principles in crown and bridgework. His system is recognized as the highest art in dental practice. In cases where an inlay is indicated as an abutment for a bridge, this author's experience

has taught him to advocate anchoring such an attachment securely to the tooth. These inlays are frequently inserted in vital teeth, and their proper anchorage necessitates extensive drilling. Fig. 1, taken from Dr. Goslee's book, shows several illustrations of inlay attachments. Fig. 2, also from Dr. Goslee's book, shows one method of splinting loosened teeth. Fig. 3, taken from the articles of Dr. J. V. Conzett, shows the necessity, in the opinion of this well-known operator and writer, of

Fig. 7.

drilling into sound tooth structure for the purpose of anchoring inlays. Fig. 4, also from Dr. Conzett, shows another case of extensive drilling. For years Dr. F. E. Roach has been suggesting the use of certain hoods and attachments by which partial dentures and removable bridges can be satisfactorily anchored to vital teeth. Such procedures frequently require drilling into sound tooth structure. Fig. 5, from Dr. Roach, illustrates a lingual hood for a cuspid tooth.

I have here referred to three men in the profession who are recognized as leaders and who are known wherever dentistry is known for their genius and skill. These men have used Desensitizing Paste for months, even before the formula was perfected, and have given it every test. Do you wonder that they wax warm with enthusiasm when they find that by the use of this innocent remedy they can accomplish their work on vital teeth without the heretofore necessary pain. This is the field of the dentist of to-day. Let us turn for a moment to the work of yesterday.

Fig. 6, taken from Dr. Black's book, shows typical buccal gingival third decays in the upper bicuspids and first and second molars. In the second molar the decay has burrowed considerably in the dentin. The lower picture is the same case after operative treatment by Dr. Black, who is

one of our highest authorities, and shows the extension and outline form of the prepared cavity. The author calls especial attention to the manner in which the cavity is extended gingivally so that the margin of the filling should lie under the free margin of the gum. We may not all fill these cavities to-day as Dr. Black advocates in his book, but certainly most of us have experienced the wisdom of following his cavity prepara-

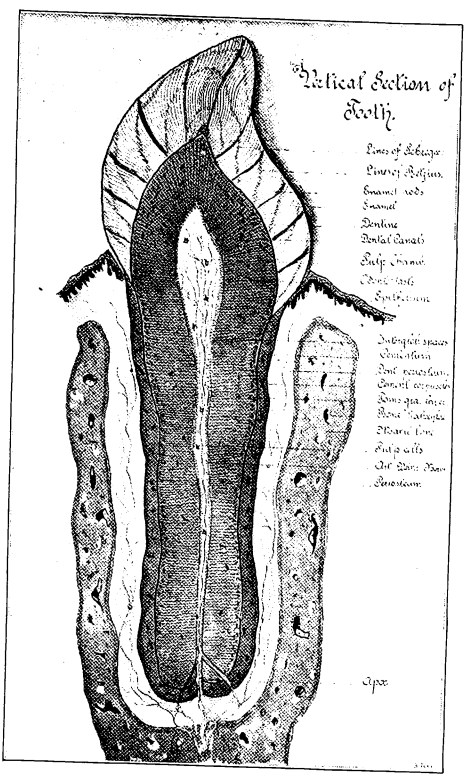


Fig. 8.

tion. In Fig. 7 we have another picture taken from the work of Dr. Black, showing the proper method of adjusting the Hatch clamp on a lower anterior tooth. Every dentist knows and every experienced patient well remembers the pain that is generally produced by such procedures. But this is not all. After the gum is forced back and the dam adjusted, the cavity is yet to be prepared and the gold to be malleted in. You may talk about the sharp, well-tempered bur, the steady hand, the smooth-running engine, your powers of suggestion, *et al;* but the patient who

has had these cavities prepared knows that pain—excruciating pain in most instances—is produced. By giving us the cast gold inlay, Dr. W. H. Taggart, of Chicago, made it possible to fill these cavities without the clamp and rubber dam, and by using Desensitizing Paste they may be prepared absolutely without pain.

In mentioning these facts I want it distinctly understood that I am not decrying the use of the rubber dam where it is indicated, and, in my opinion, it is indicated in the tratment of all cases which involve the canals of the teeth. Too much emphasis cannot be placed upon the importance of treating the canals of teeth under the most aseptic pre-

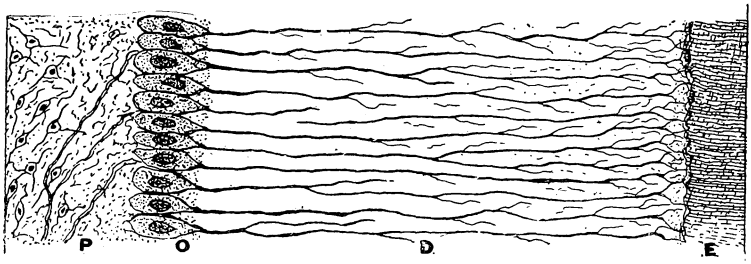


Fig. 9.

cautions. But such teeth, if badly decayed, may be built up with cement or matrices, when the adjustment of the rubber dam should cause no pain.

Directions for Using Desensitizing Paste.

In employing Desensitizing Paste, it is not necessary to remove any of the carious dentin that is at all sensitive. To attempt this often causes pain, and the remedy, if used at all, is intended to, and will, *absolutely eliminate all pain in cavity preparation.* The cavity and immediate tooth-surface should be dried with alcohol and a small amount of the paste sealed therein with a good cement. Better results will be obtained if the remedy is spread over the cavity surface. This can be accomplished with a ball of cotton held in the pliers. In gingival cavities, such as were illustrated in Fig. 6, it is often necessary to flow the cement over the enamel surface, depending entirely on its adhesiveness to hold the paste on the softened tooth structure.

Twenty-four to forty-eight hours is sufficiently long to bring about complete desensitization, and this is the proper length of time to leave the remedy sealed in a tooth. However, no harm will follow if the paste should remain in the tooth for a longer period. The small amount employed will soon exert its full influence, after which no further action follows. An effort should be made to hermetically seal all the margins of the cavity—thus confining the action of the remedy to the dentin. This

is sometimes difficult to do with gingival cavities. If it is not accomplished, a certain amount of the formaldehyde gas may escape as it is liberated, in which case the dentin would not be so profoundly affected.

When it becomes necessary to prepare a cavity in practically sound dentin, as is frequently the case for bridgework and in superficial cavities, it may be necessary to make a second application of the paste in order

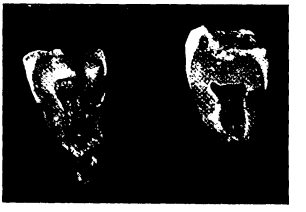


Fig. 10.

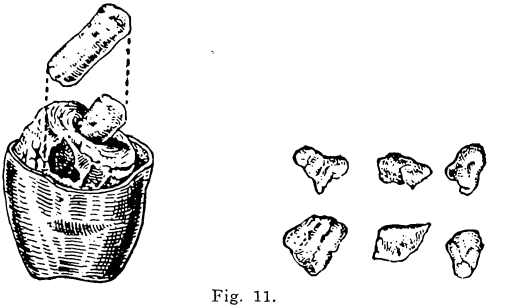


Fig. 11.

to avoid all pain. In all cases where there is considerable decay, one application will be sufficient to desensitize the entire cavity. The depth to which the dentin is affected by the remedy will depend upon the condition of the dentin.

Precautions. There are no special precautions to be observed in using Desensitizing Paste, so far as the remedy itself is concerned. It will not even destroy the gum tissue to any appreciable extent, at least, if sealed in contact with it. It will be necessary for the dentist, however, who desires to use this remedy intelligently to so school himself in pulp pathology that the remedy may not be used in those cases where the reading of the clinical symptoms would clearly indicate the removal of the pulp.

In deep-seated cavities which approximate the pulp, yet where the organ is not diseased to the extent of necessitating its removal, the paste need not be applied to the entire cavity. In these cases extra small doses may be placed over such areas only as will need to be drilled subsequently

in the cavity preparation, and some anodyne remedy, like phenol compound, placed immediately over the pulp. The danger in using this preparation does not lie in the possibility of affecting deleteriously a healthy pulp, but rather in the probability of diseased pulps being left

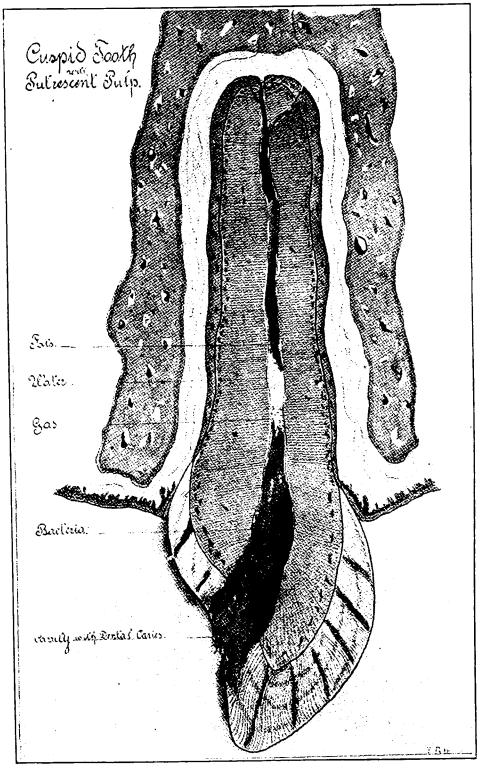


Fig. 12.

in teeth to die and putrify, because of the absence of sensation in the dentin after the remedy has been used. The decision, therefore, as to whether or not the pulp is diseased and removal necessary should be made before employing Desensitizing Paste.

In my clinical experimenting I have, at times, purposely used the paste in cavities of extensive decay, where I suspected the pulp was affected. At the subsequent sitting I was able to painlessly remove all of the carious dentin which extended very nearly and in some cases to the pulp. In those cases where the pulp was exposed it was found to be sensitive and would bleed freely, indicating, to my mind, that it had not been affected by the remedy. However, it is our plain duty in such

cases as these to remove the pulp, for I do not believe that decay can extend to or nearly to the pulpal organ without the latter being affected by the carious process, if not infected by the germs present in the cavity.

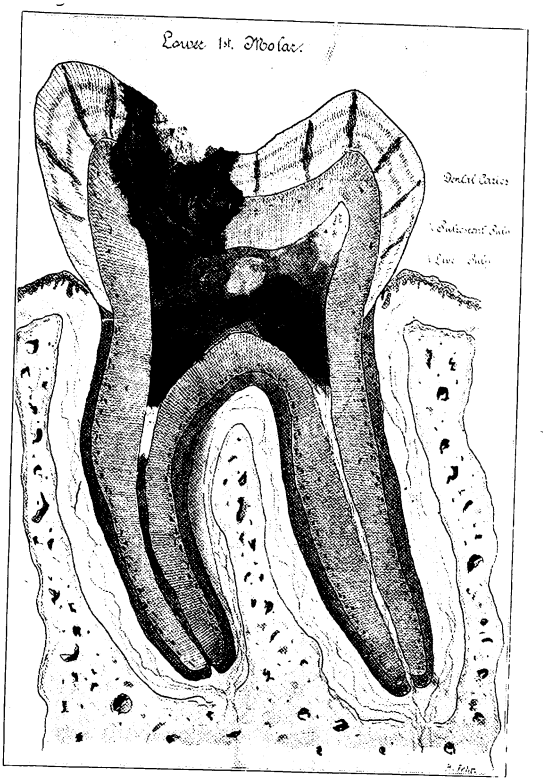


Fig. 13.

Antidote for Desensitizing Paste

The dental pulp is a delicate and susceptible tissue, and occasionally a tooth in which Desensitizing Paste has been sealed will grumble for a time even though the cavity is not deep and the pulp normal. This will not often happen if the diagnosis is correct, and the remedy has been used where it is indicated. Instead of this fact being an objection to the remedy, I feel that it is a distinct advantage, for it will serve as a check on the careless or indifferent operator, who is likely to use the preparation in nearly all cases regardless of the condition of the pulp. It makes the remedy automatic in its action and practically fool-proof. Should the paste be applied to a tooth in which the pulp is diseased it may make the tooth ache severely. In such a case

the action of the remedy may be checked at once by applying *Aromatic Spirit of Ammonia* to the cavity on a pledget of cotton. After a moment or so the cavity may be dried and an anodyne dressing sealed therein or the pulp may be removed, according to the operator's judgment.

Pathology of Tooth Tissues.

In directing your attention to the use of this new remedy, I wish to emphasize in connection therewith the importance of a knowledge of the anatomy and histology of the tooth structure, as well as the pathology of the pulpal organ and dentinal fibrillae. Fig. 8 is an original slide taken from my own writings, and shows a vertical section of a lower cuspid tooth. Fig. 9, taken from Dr. Black, is a diagram illustrating sensation without nerves in the dentin. Here we see the pulp of a tooth with nerve endings in physiologic connection with the odontoblastic cells. The fibrillae of the dentin are prolongations of the odontoblasts, and any injury to them is an injury to a portion of the odontoblast and is transmitted by the nerve to the brain. Fig. 10 shows the best specimen of a pulp nodule that I have ever seen. The tooth is a lower third molar and was extracted because it was causing more or less trouble. There is but slight mechanical abrasion and no other known cause for the pathologic condition. Fig. 11 shows another pulp nodule, nearly one-quarter of an inch long, which fits the canal as perfectly as a pea fits a pod. The tooth for years had carried an ill-adjusted gold shell crown, which had been placed without devitalization and the proper trimming of the root. In this illustration also are shown several nodules of varying shapes and sizes, such as are commonly found in practice. These conditions result from certain constructive diseases of the pulp. Fig. 12 shows a gangrenous pulp, the result of an infection by saprophitic bacteria. The pulp has died from the destructive disease, and the canal is filled with intermediate and end-products of pulp decomposition, but no pus. Fig. 13 illustrates how we may find the pulp tissue gangrenous in one or more canals of a multi-rooted tooth and vital in the other one or two canals, the result of an infection also, and a destructive disease.

Time will not permit me to discuss here in detail the various diseases of the pulp. This I did in a paper read before the Chicago Dental Society last December and published in the March, 1914, number of the *Dental Review,* and from this paper many of these illustrations are taken. While it is true, generally speaking, that pulps which are diseased beyond the condition of active hyperemia should be removed; it is also true that this organ has been destroyed far too ruthlessly in the past. The work of Rosenow and the observations of Hunter, Murphy, Billings, and others of the medical profession, and the investigations of Grieves, Rhein, Cook, Moorehead, Hartzell, and others of our own profession,

along the line of periapical infections and the systemic results, should teach us to conserve the dental pulp in every case where it is practicable and consistent with good dentistry. Thousands upon thousands of normal pulps have been sacrificed for no other reason than that the dentin of the tooth was hypersensitive. When we think of the difficulty—not to mention the carelessness—under which these pulps are often removed, and of the frequent periapical infections resulting therefrom, we behold a sad spectacle indeed. Desensitizing Paste will not only eliminate pain in filling vital teeth, but it will also be the means of saving these pulps, which, under similar conditions, heretofore have been destroyed.

Caution in Relation to Death of Pulps.

In offering this valuable remedy to the profession, I wish specifically to call attention to the fact that every dentist has had cases in his practice where vital teeth have ached after permanent fillings have been inserted, and that pulps die occasionally following these operations. Unless the dentist is well posted on pulp pathology and cautious in his diagnosis, similar experiences will follow the use of Desensitizing Paste. If such should be the case, however, it will be through no fault of the remedy—it will be the fault of mistaken diagnosis. I can understand how much harm can follow the use of any remedy or method by which cavities can be painlessly prepared. In the hands of the careless operator, pulps may be left in which should have been removed. In the hands of that great army of conscientious practitioners, who constitute the vast majority, Desensitizing Paste will lighten their burdens and prove its worth. I repeat that in the hands of such men this remedy will be a God-send and a great benefit to suffering humanity.

In my clinical experimental work with this remedy I have been seriously handicapped, for the reason that my private practice is largely a special one; and, therefore, I do not have the opportunity of using such a remedy to the extent that a general practitioner would have. I did not wish to rely wholly upon the students in college for clinical data; therefore, before the formula was perfected I took certain men into my confidence, told them what I was doing, and, placing the remedy in their hands I asked them to try it in their practice, note the bad results, if any, as well as the good, and report to me. This was done to confirm my own experience with the remedy. Everyone of these men who made a report at all were so enthusiastic that I was both pleased and encouraged. I desire at this time to thank Dr. J. V. Conzett, of Dubuque, Iowa; Dr. R. Ottolengui, of New York; Drs. Hart J. Goslee, F. E. Roach, E. W. Elliot, D. M. Gallie, J. E. Keefe, C. N. Johnson, L. S. Tenney,

C. E. Bentley, E. A. Crane, of Chicago, and others, for their aid and assistance.

In closing I want to say that the dread of the dental chair, the severe nervous strain upon dentists, the failures of operative procedures upon vital teeth, and the ruthless destruction of the dental pulp, with its frequent evil sequelae, have been due more to hypersensitive dentin than all other causes combined. It is a great pleasure and satisfaction, therefore, for me to present this formal paper for the first time on Desensitizing Paste before the Second District Dental Society of New York.

President's Address.

By William H. Gelston, D.D.S., Camden, N. J.

Read before the New Jersey State Dental Society at Ocean Grove, July, 1914.

To the Members and Guests of the New Jersey Dental Society:

It is my privilege and honor to welcome you to our forty-fourth annual convention.

A new era has dawned for the New Jersey State Dental Society, and when this convention will have passed into history, then, and only then, will the members who have had the good fortune to attend the whole of this session realize what the various committees have accomplished, that you might take home with you the knowledge and new appurtenances that will assist in giving to your clientele the latest and best.

Words are inadequate to express my appreciation of the results accomplished by those who have labored so arduously that this meeting might go down in history as a successful new departure from the old methods of holding conventions. It is therefore with inexpressible gratefulness, as the representative of this society, that I would thank the chairmen of the various committees, and each and every individual that has assisted and is still working for this consummation so devoutly to be wished.

The new departure from the old method of holding conventions will, we believe, give an incentive to our members that will procure their attendance throughout the whole of the session, that would otherwise be impossible to attain. In the past, members could attend the one big day of clinics, return to their homes, and wait for the papers and discussions to be published in the magazines. This year we have progressive essays and progressive clinics which will not be published, and which can be obtained only by the same methods by which college lectures are obtained,

i. e., by attendance. They essay committee is to be congratulated upon their success in securing such eminent authorities in their course of progressive essays, which will be of inestimable value to those who wish conscientiously to serve the public. As we all know, the crown or filling may be the most beautiful and artistic work of an expert, but if done without the knowledge that is necessary for the successful treatment and filling of pulpless teeth, the work is in vain. The Clinic Committee, likewise, is to be congratulated upon their success in procuring progressive clinics. Admission to these clinics, like the progressive essays, can be obtained only through membership. With such inducements, it is but a question of a short time when only the Rip Van Winkles will not be knocking for admittance to our society. We have been considering inviting members from other State Societies as guests of the New Jersey State Society to these post-graduate courses. You already have cognizance of what your exhibit committee has been doing; this exhibit is the largest and most artistically arranged of any ever staged by this society. The program, press, registration, electrical and publicity committees have given an excellent account of themselves. The remainder of the committees will be heard from later in the session, and will give as good an account of themselves as the above mentioned.

Reorganization.

It has been stated that co-operation is the life of trade. We are sure co-operation has given us a convention such as this society has never before enjoyed. Your officers, having in mind reorganization, carried out the principal of local representation on the various committees in so far as it was possible so to do. At your last session a minute was passed that the Executive Committee and a member from each local society (who is also a member of the State society) constitute a committee on reorganization. I would recommend to you that this committee be continued for another year and that it also include your Secretary, Treasurer and Advisory Committee, as these officers were on the original committee for reorganization and their advice and experience would be of inestimable value.

Owing to the depleted condition of our treasury your officers deemed it unwise to secure counsel for the purpose of drafting a new constitution and by-laws at this time. The best business principles, therefore, the best interest of the society could be better served by postponing reorganization for another year. Then with a clean page on the debit side of ledger we will be in a position to effect, without further embarrassing our society, the much desired reorganization.

It is possible to attain a portion of this desideratum by enlarging

our executive and membership committees that different portions of the State may be represented on both. I would, therefore, recommend to you the amending of Article III of the Constitution, striking out the word "four" and substituting the word "thirteen," so as to read: "executive committee of thirteen members," A committee on membership to consist of five members, striking out the word "five" and substituting the word "thirteen," so as to read: "and a committee on membership to consist of thirteen members."

If reorganization is consumated next year our new members will become members of our State society through the local societies, no initiation fee being required. Had our financial condition permitted this change it would without doubt have occurred this year. To continue our good faith and give this year's applicants for membership a square deal, I would recommend to you the amending of Article V of the By-laws, striking out "The initiation fee shall be five dollars," and substituting—"an initiation fee of five dollars shall be collected from all applicants who are not members of a local society." And amend Article II of the by-laws to read: "and accompanied by the initiation fee of five dollars if said applicant is not a member of a local society."

Law suits are an expense which should be avoided wherever possible. Our constitution states, Article VII, Section I of the by-laws: "the regular meeting of this society shall be held annually at (————), commencing on the third Wednesday of July at 10 o'clock A. M." While in session last July this body deemed it wise to change the date of this year's meeting to the fourth Wednesday in July, that our convention might not conflict with that of the National Association. Later the date of the National was changed one week, which necessitated the calling of a special meeting to rescind the original motion of change of date that we might hold our convention as the constitution provided. To prevent all legal controversy and complications of calling special meetings, I would recommend the amending of Article VII, Section I, striking out "commencing on the third Wednesday of July at 10 o'clock A. M.", substituting "the annual meeting of this society shall be held in July, the dates and place to be selected by the Executive Committee."

Trust Fund Committee.

At the session of one thousand nine hundred and nine a minute was passed creating a committee and trust fund for the relief of indigent members. This committee, the motion so states, is to be "a permanent one to report to the society annually." There has been some controversy in the past as to the interpretation of this resolution. At your last session Dr. William I. Thompson, your presiding officer, asked

for a ratification of the appointment of Dr. Truex to fill the vacancy caused by the death of Dr. Stockton, and Dr. Jones as treasurer to fill the office left vacant by Dr. Truex appointed as chairman. The legality of these appointments had been questioned by members of the committee, who assumed that the officers and members had been appointed for life. That there may be no further controversy I will ask the society to construe the meaning of the motion, *"Resolved,* That the President, before the close of this meeting, appoint a committee of ten members to report at the 1910 meeting concerning the creation of a trust fund by subscription or by an advance in the dues, for the systematic relief of members of the State Society only, who have been active members for not less than ten years and who may be in want and that this committee be a permanent one and to report to the society annually." You are asked to construe the clause "and that this committee be a permanent one, to report to the society annually." Is it the committee that is to be permanent or the personnel of that committee?

No financial institution elects its officers nor hires an employee for life; that would be decidedly poor business. Have we minutes on our books that will prove what has been stated of our profession, that we are the poorest kind of business men? The above clause states that there shall be an annual report; the society's minutes show no report from the creation of this committee in 1909 until 1912. That is poor business. Members of this committee inform me that they never received notice of a meeting, that is poor business. The secretary informs me up to date (February 2, 1914) no minute book has been procured (that is decidedly poor business), but that the minutes were as follows; that the society may have a record of the proceedings of this committee they are herewith given in full:

"Trust Fund for Aged and Indigent Dentists, July 21, 1909. Committee met and organized. Quorum present. July 18th, 1912. Committee met. Quorum present. Treasurer was ordered to pay one hundred dollars to a member. Order paid. July 17th, 1913. Committee met. Quorum present. Treasurer was ordered to pay one hundred dollars to a member. Order paid."

You will note that there was no meeting of this financial institution from 1909 to 1912 when the committee reported to the society $429.04 in bank. You will also note that there is no record of this committee having met to consider plans for the investment of this fund in gilt-edged securities up to 1913, when your society borrowed $818.00 of this fund. This is decidedly poor business. No reflection, however, is cast upon your chairman who was appointed in 1913. There is, however, a reflection on

a society that will allow such unbusiness-like methods to exist. Therefore, if you decide that the personnel of this committee has been appointed for life, I would recommend that the motion creating that committee be rescinded, and that it be made a committee to be appointed annually.

New Jersey Dental Journal.

Almost all State dental societies issue a quarterly bulletin, keeping the members in touch with the society. *The New Jersey Dental Journal* is issued monthly in the interests of our State and local societies. We have reason to be very proud of this journal. In March the Publication Committee presented this society with one hundred dollars from their net proceeds. While the journal is published in the interest of our State Society it has never been officially recognized by this body. As it is not a burden, but a financial asset, a means of keeping the members in touch with the State and local societies, and incomparably better than a quarterly bulletin, I would recommend that a motion be passed whereby this journal may become the property of this society and its official organ.

Resolutions of Appreciation of Services of C. F. Jones.

A past disagreement among members financially embarrassed our society; collections from subscriptions did not meet our obligations by hundreds of dollars. A good Samaritan, however, came forward, assuming all our liabilities with his personal check. This was no other than our genial treasurer, Dr. Charles F. Jones. I would, therefore, suggest that a committee be appointed to draft suitable resolutions to be spread upon our minutes in recognition of the services rendered.

Affiliation with National Dental Association.

The time is at hand when we should consider the question of affiliating with the National Dental Association. The dental profession has been entitled to recognition as a specialty of medicine. The National Dental Association can and will accomplish more than this, with the support of every State in the Union. The Scientific Foundation and Research Commission, through Dr. Hartzell, has produced in animals typical joint, heart, kidney and aorta lesions by inoculations with cultures taken from dental foci. What this committee alone is doing would repay you many-fold for affiliation. The metallurgical researches will save a considerable sum of money to the profession if you are looking at the financial side.

Dr. Homer C. Brown states "the world's famous surgeon, Dr. Chas. W. Mayo," closed a very interesting paper as follows: "The next great step in solving the question of preventive medicine must be taken by the

dentists. The question is, will they do it?" They have done it and are going to do more. As the New Jersey State Dental Society do we intend to help. I would recommend that we pass a resolution to become a constituent society of the National Dental Association.

Dental Health Board Members Recommended.

Our profession being a specialty of medicine we must assume the responsibilities that always accompany recognition. It is gratifying to see the interest taken, and the number responding, volunteering their services in establishing free dental clinics and helping to educate the public in the Oral Hygiene propaganda. We cannot, however, be satisfied with the present status: this profession should be represented on the State Board of Health. Having recognized the responsibility resting upon us for the prevention of many serious systemic infections it is our duty to call the attention of the Governor to these facts, that he may recognize the advisability of placing a member of our profession on the board. I would, therefore, recommend that a committee be appointed for that purpose.

Annual Registration with Fee Recommended.

Ways and means for the elimination of the illegal practitioner in our State; and our State Board of Registration and Examination with its present requirements, will necessitate your close attention.

In the April number of the *New Jersey Dental Journal,* there appeared under the title, "The Illegal Practitioner," an ill-advised article by the president of our State Board of Dental Examiners, stating to all the dental world that the Board was "broke" and that there were already two hundred illegal practitioners in the State, which condition they were powerless to correct. In other words, like the dog that is whipped and turns up to the enemy, the Board says, "We give in, help yourself." If the dental law is a by-word to be laughed at by illegal practitioners, and the president of the Board admits they are powerless to prevent such a condition to such an extent as to rush into print and so announce, it would be better for that president or Board to resign than to put the honest young men to the expense of an examination and allow the charlatan to ply his nefarious business undisturbed.

The officers of your society have decided that something can be accomplished to prevent this condition and called a joint meeting with the State Board; also asking each member for a set of their examination questions. The president of the Board tried to see some connection between attendance and the questions, stating he could see none, and declined to attend. All the other members being present, a plan was evolved for collecting a

sufficient sum to commence prosecution. It was also unanimously decided that a published list of all licensed practitioners in the State, with college, year of graduation, number of license, when issued and latest residence known would be a great help to detect infractions. An hour of cross-questioning the acting secretary brought forth the fact that it would be possible to get out such a list within a month. Upon learning of the instructions given the acting secretary by the Board, the president of that body wrote our secretary that it would cost us fifteen dollars to get out such a list, and we have assisted that Board to the amount of five hundred dollars at a time to prosecute illegal practitioners. Gentlemen, your Board still needs renovating. The receipts from this society should be spent for that which will educate and elevate its members. If these funds are more than sufficient, reduce your dues and give your members the benefit. Every licensed practitioner in the State should be willing to pay a nominal fee each year to assist in protecting the fair name of the State in which he resides and for the uplift of his chosen profession. This society should not be required to bear the burden of that which is of equal protection to non-members.

If you expect to stop the illegal practice of dentistry in the State it must be done on a business basis and not by filing a report that the receipts were $2,616.11 and the incidentals were $2,263.83; nor by taking cognizance of a case in the opposite end of the State, and taking no action in a case in the resident city. You can make your own inferences. If there are two hundred illegal practitioners in the State it proves that your present methods are very defective. Means must be provided whereby this blot will be eradicated for the protection of the citizens and of our profession.

I would, therefore, recommend an annual registration license, with a fee of not less than two nor more than five dollars, the amount of said fee to be determined by the Legislative Committee after careful computation of the expense necessary for inspection and annual license, after the plan of the department of motor vehicle registration and regulation. The proceeds of this fund must be used for the purpose of prosecuting illegal practitioners.

Certain recommendations to the Legislative Committee were passed upon by this body at our last session, increasing the number of examiners on the Board of Registration and Examination in Dentistry, including five other recommendations. If any of the present recommendations conflict with those already passed, I would advise that the Legislative Committee in conjunction with the Executive Committee be given the power to select those best suited. Or by the incorporation of a part or

all of those different recommendations to effect their several particular needs.

Dental Education, Examinations and Requirements.

The preliminary requirements have been raised to a four-year high school course which is excellent to a certain point. The practical requirements are the same as they have been for the last twenty odd years with one exception in prosthesis, *i. e.,* the soldering of a three-tooth bridge to supersede a full upper denture, which was an *innovation* (the italics are mine), so called, by a former examiner. Stop and consider for a moment the field of prosthetic dentistry, and the absurdity of permitting an applicant to practice that whole field on the success of soldering a little three-tooth bridge. The theoretical examinations, the questions of which I have been permitted by certain members of the Board to examine, are very fair. I would thank the gentlemen from Morris, Hudson and Camden counties for their assistance. Practical operative dentistry covers too small a field. The successful insertion of one gold approximal filling and one amalgam filling proclaims the candidate proficient to practice upon the dear, confiding public, until the said public becomes discouraged with operative dentistry and seeks exodontia for relief. Said relief may happen to be rendered by another newly licensed practitioner, who has never yet administered profound anesthesia. These, gentlemen, are the conditions existing to-day under our requirements to practice dentistry. Where lies the responsibility? In the colleges? No. They cannot get sufficient material for practical work. The responsibility lies with us. I stated that a four-year high school preliminary course is excellent to a certain extent. If the four-year course ends all preliminary requirements other than a dental college diploma, you have missed the mark for which you aimed. All other things being equal, give me a young man with a two-year high school course and dental college diploma and at the end of two years more in my office, I will give you a practitioner fifty per cent. better equipped for practice than the four-year high school student. You should have no lower standard for your preliminary requirements, but you should have a much higher standard for your practical requirements. The free dental clinics, and assistant operative positions with a legal practitioner, make excellent openings for the placing of candidates wishing to practice in this State. Allow them to take the theoretical examinations immediately after leaving college, but not the practical until after they have been placed as an assistant for one year, then to be examined on up-to-date operative and prosthetic dentistry. I would, therefore, recommend the amending of the preliminary education law to include one year of practice before or after graduation, in a legal dental office or dispensary, sanctioned by the Board of Examiners.

Death of Chas. A. Meeker.

The year 1914 makes it necessary to record with regret the death of another of our oldest members. I refer to Dr. Charles A. Meeker, who for thirty-six years was secretary of this organization. I would recommend that a committee of five be appointed to draw up suitable resolutions to be sent to the family of the deceased, and that a copy be spread upon the minutes of this society.

I thank you for your close attention.

Report on Principles of Cavity Preparation.

By H. W. P. Bennette, M.D.S. (Liv.), L.D.S., England, Birkenhead

Section III. Sixth International Dental Congress, London, August, 1914.

It does not enter into the province of this paper to discuss the advantages or disadvantages of the cast gold inlay as compared with the foil filling, nor do I intend to do so, beyond stating my belief that the cast inlay affords us a better means of restoring to full functional activity any tooth which has been attacked to any appreciable extent by caries, than does the foil filling.

It must not be understood by this that I have discarded the foil filling, but that I have limited its use to small cavities which have a box-like formation; that is to say, four walls and a floor, and which do not call for a contour restoration.

For convenience of description I will divide the types of cavities into three groups:

(*a*) Those rendered necessary, or brought into being by imperfections in development, such as fissure cavities or pits.

(*b*) Those which occur upon smooth surfaces.

(*c*) Those which involve both of the above.

In group (*a*) I use the words, "rendered necessary by imperfections in development"; wishing to imply that I do not hesitate to cut out faulty fissures or pits, even though they are not as yet seats of caries.

The reason for treating carious teeth are two, namely, the removal of diseased tissues, and secondly, the restoration in full of these lost tissues.

Bearing this in mind I invariably divide my operation strictly into two sections, and therefore never commence to shape up a cavity until I have completely removed all affected parts.

Technique of Cavity Preparation.

The first step in the operation is to break down all frail enamel margins by means of a freshly sharpened chisel, cutting until hard, healthy enamel is reached in every direction.

When this has been done, as much of the carious dentin as can be removed by the use of excavators is cut away, the cutting being done from points near the centre of the cavity toward the circumference in order to avoid undue pressure and consequent pain being inflicted upon the pulp.

When it becomes difficult to remove partly infected dentin by this operation, a suitable rose head bur is used and by this means all unhealthy dentin is removed. If at this stage any overhanging enamel margins are present, they should be removed by means of a convenient sized carborundum stone moistened and used with a light steady touch while revolving rapidly in a true running handpiece.

I use stones in preference to burs for all trimming of enamel margins, as I consider they cut better and are less painful to the patient—to say nothing of the speed the work can be done at, and the finished surfaces they give. Small knife-edged stones used in either the straight or contra angle handpiece are particularly useful for opening up fissures especially where there is little or no caries present.

At this stage, and not before, should the shape of the cavity and the position of the cavity margins be finally decided upon. At this point, also, pulp or root treatment, as the case may be, should be taken in hand, and, generally speaking, completed before passing on to the rest of the operation of preparing the cavity for the reception of the inlay.

The above description serves for every form of cavity met with.

It would be quite impossible in a paper of this length to go into the minute details in the preparation of even all the most typical cavities we have to deal with. I shall therefore attempt so to word my description as to cover the majority of them.

Cavity Margins.

First, let us consider a typical case in group (*a*). Assuming that all infected tissue has been removed, and leaving out of consideration any pulp or canal treatment, we must decide upon the position to be occupied by the cavity margins.

Here, as in all cases, due regard must be paid to the chance of the recurrence of decay, and the joint between healthy tooth and metallic restoration must lie in the region of comparative immunity. This on all occlusal surfaces is, practically speaking, at every point, except the de-

fective fissures, so that when these have been freely cut away the cavity margin occupies a position of safety. Sharp corners, such as lie at the junction of the fissures, should be rounded off in order to simplify the cavity as much as possible.

Cavity Walls.

This being done, the next step is to shape up the walls of the cavity. The floor, or pulpal wall, should be made as flat as possible, and the remaining walls should be as near a right angle to this as it is convenient to make them. In practice this angle will be slightly obtuse; but it is wise to make it as little so as possible.

The best procedures in my hands for bringing this about is first to cut the floor with the face of an inverted cone, but taking care not to undercut the walls. Then proceed with Dall's inlay bur and finish off with either a drum-shaped stone or else with an old fissure bur covered with moistened carborundum powder. This gives a smooth surface, and insures cutting the face of the wall in its entire depth at one time.

The angles made by the walls perpendicular with each other should be rounded and should follow the line created by the margin of the cavity.

Testing Cavity Form.

At this point, if I have any doubt about being able to withdraw my wax pattern, I soften some gutta-percha and force it into the previously moistened cavity; let it stiffen and then carefully remove by fixing a heated sprue, which, when cold, can be seized by dressing-pliers. If it leaves the cavity easily, all is well, and in any case, a careful examination of the plug often suggests some slight modification or improvement in the shaping of the cavity.

Cavo-Surface Angle.

The last step, but a most important one, is the treatment of the cavo-surface angle, and with Dr. J. V. Conzett and others I lay particular stress upon this part of the preparation. I prefer a long bevel taking in the whole thickness of the enamel.

This requires care and a good deal of patience. In the type of cavity at present under discussion, I find a cone, or drum-shaped stone of great use.

When this surface is carefully polished I consider the cavity is ready to receive the wax from which the matrix is to be made.

This paper is not concerned with this part of the procedure, but it is well to examine the pattern when obtained and to learn from it whether

the cavity preparation is all that it should be or not, and if not it can still be remedied.

Quite a common complication of this simple class of cavity is where a defective groove extends over the buccal or lingual surface of the tooth.

In this case the treatment is the same. The pulpal wall is extended and becomes the floor of the groove, the walls are at right angles to it and the cavo-surface angle is bevelled. Obviously the occlusal end of this groove is wider than that which approaches the gingival margin, for the convenience of withdrawing the wax pattern. In those cases where this groove leads into a pit which when cut out is larger than the width of the groove, I prefer to treat is as a separate cavity rather than to sacrifice too much healthy tooth substance.

The pits formed on the lingual surfaces of the upper incisors need no more description than the above, as they should be simple box cavities.

We pass now to those cavities which occur upon smooth surfaces. Very little further description is required for this type of cavity.

Labial and Buccal Cavities.

The most common examples are those which are situated at the gingival margin on the labial surfaces of incisors and cuspids, and the buccal surfaces of premolars and molars.

Here the floor or pulpal wall should be flat and the surrounding walls at right angles to it, and the cavo-surface angle bevelled, except in the region where the cavity margin passes beneath the gum. Here I prefer a face joint, for the simple reason that it can be practically finished out of the cavity, and thus avoid damage to the soft tissues; it also occupies a region of immunity.

The only cavities on the mesial or distal surfaces that I treat in the above way are those which are situated in teeth which have lost their neighbors, and where the enamel and dentin on the occlusal boundary are strong and healthy.

All other cavities which have their origin on these surfaces I open up to the occlusal surface and treat from there.

Occluso-Proximal Cavities.

One description for all mesio- or disto-occlusal cavities must suffice.

All defective tissues having been removed, the cavity margins are extended to those regions which are comparatively immune from decay.

The gingival margin should occupy a place just beneath the gum and the buccal and lingual margins, which should be parallel or slightly divergent at their occlusal ends, should meet it in slightly rounded off

angles. The occlusal margin will depend upon its position and the condition of the fissures on that surface.

If these are involved they must be cut out as described above and the two cavities must merge into one another.

The gingival wall should be cut flat at right-angles to the long axis of the tooth and the pulpal wall should meet this at a right-angle. The gingival wall may here be considered as the floor of this portion of the cavity. The remaining two walls, buccal and lingual, should meet both the gingival and pulpal at right-angles, or if there be sufficient tooth substance to allow of it without risk of weakening, these two walls may occupy a position at an angle which is slightly acute with the pulpal wall. If this is not possible or is undesirable, anchorage may be obtained in most cases by either broadening the end of the fissure or occlusal portion of the cavity which is distant from the main portion, or drilling a depression in the pulpal wall of this portion of the cavity.

When this is done nothing remains but to create the cavo-surface bevel and take a test wax pattern.

The object is to so form the cavity that the wax matrix can be withdrawn from it in an occlusal direction.

If the fissures are not involved, I find the simplest form of retention is to make the bucco- and linguo-axial angles slightly acute, and if possible increase this tendency as the occlusal surface is reached. This, together with a flat gingival floor, an accurate contact point restoration, and good occlusion is sufficient to retain any medium-sized inlay in this position.

If the root canals have been treated, additional retention can be obtained from this source by means of a post of iridio-platinum wire around which the inlay can be cast.

M. O. D. Cavities.

In those cases where both the mesial and distal surfaces are involved, it is necessary to make one complicated cavity.

The preparation is the same with this addition. The cusps are deliberately reduced, so that they may be reproduced in gold.

This is particularly necessary in the case of upper premolars. In this way the risk of splitting either half of the tooth during mastication is reduced to a minimum.

Approximal Cavities.

It only remains now to give a brief description of the preparation of cavities situated in the approximal regions in the anterior teeth.

Generally speaking, these cavities can be made fairly simple by quite freely opening them up from the lingual aspect.

The margins are extended in every direction until the safety line is reached. If the cavity is one which does not involve the incisal edge, sufficient retention can be obtained by preparing it as follows:

The gingival margin is placed beneath the interdental portion of the gum tissue, and merges into the labial margin which extends as far as the mesio- or disto-lingual angle of the tooth. The lingual margin is brought into existence by the preparation of the pulpal or axial floor.

The gingival wall is shaped so as to be at right-angles with the long axis of the tooth, and the axial wall is made at right angles to the gingival wall. This is accomplished by opening up the cavity from the lingual aspect with small stones or fissure burs held in the contra angle handpiece, great care being taken not to remove all healthy dentine from the back of the labial wall. This operation virtually forms the labial wall which thus makes a right-angle with the axial wall. It will be seen also that this forms the lingual margin of the cavity. Sufficient retention can then be obtained by prolonging the lingual margin and the portion of the axial wall adjacent to it, both in the direction of the root and the incisal edge of the tooth—thus forming a dovetail.

This portion of the margin and a small portion of the extremities of the labial and gingival margins can then be bevelled and the cavity is ready for the trial wax pattern.

Second District Dental Society of the State of New York.

A regular meeting of the Second District Dental Society, of the State of New York, was held on Monday evening, October 12, 1914, at the King's County Medical Library Building, 1313 Bedford Avenue, Brooklyn, N. Y.

The president, Dr. Stevenson, occupied the chair, and called the meeting to order.

Dr. J. B. Buckley, of Chicago, read the paper of the evening.

Discussion of Dr. Buckley's Paper.

Dr. Hart J. Goslee, of Chicago.

Of the many dental meetings which it has been my pleasure to attend, none has gratified me more than when visiting the Second District Dental Society of the State of New York. Indeed, it has been my privilege to be with you so often that, as I took occasion to say to you the last time I was here, I am beginning to feel quite at home in your midst; and why should I not, when only a little while ago one of your officers came up to me and asked me if my dues had been paid? (Laughter.)

It seems to me, if you will permit me to speak in the first person singular, that I have been signally fortunate. It was my especial privilege and pleasure to come to New York seven years ago, to make an effort toward opening the discussion of a paper by Dr. W. H. Taggart, which was revolutionary in its character, and which changed the whole aspect of the art side of dentistry. I shall always look back upon that occasion with pleasure and keen gratification—to think I should have enjoyed that privilege. I can remember very well when I came with Dr. Taggart and was met at the train by Dr. Ottolengui, the eagerness with which

Dr. Ottolengui wanted to know what Dr. Taggart had to give to the profession at that time. He could hardly wait until he got us up to his home, when he insisted upon knowing what Dr. Taggart had, and when he saw, he looked at him with amazement and said: "Why, Taggart, we have now reached the era of painless dentistry." Little did he realize, perhaps, that that era was so close upon us. It is true that the introduction of the cast inlay made it possible for us to do better work with far less pain to our patients than had ever been possible before; but from to-night on, ladies and gentlemen, we can go far, far beyond that.

The highest achievement I think that lies within the power of mankind is to reduce or eliminate pain, and I believe that Dr. Buckley deserves a monument for having introduced to us a remedy which I can say to you from personal experience absolutely does everything which he claims for it.

I have been so fortunate as to enjoy his close friendship, and, as he has told you, to help him in a very small way in ascertaining whether what he hoped this remedy would really accomplish could be done. Enjoying that friendship, I gave him every possible encouragement, and I felt most happy when he selected me among the few he chose to try this out.

In the few months I have had it I have used it in 126 cases, as I told Dr. Buckley for the first time yesterday on the train, and I can report 100 per cent. of absolute success. Indeed, I do not think failure is possible. These 126 cases mean necessarily that I have used it almost everywhere—in all classes of patients and cavities—and in not one single case have I been disappointed in its effectiveness or in the result it produced, beyond the fact that two conditions sometimes presented: one was, that a second application became necessary in three or four cases, in order to permit me to extend the cavity preparation to the desired areas. The other was the aching of the tooth. In some seven of eight cases, the patients complained when they came back the next day or the day after that the tooth had ached severely. That may have been my fault. I might have placed it where some kind of preliminary treatment—an anodyne or something of a soothing nature should have been used. In each of these instances, however, after preparing the cavity without pain to them, and progressing a little further to other work in the mouth, I said: "Shall I try to prepare this cavity without applying the desensitizing paste or shall I just go ahead and use the paste as in the other cavity?" and in each instance the patient said, "Doctor, put in the paste" (laughter), which indicates to me that the ache was not quite as severe as they would have me believe.

I am happy to take advantage of the opportunity to come here and participate in a small way in the presentation of this remarkable achievement to-night, and it will be far more revolutionary, I believe, even than was the achievement presented by Dr. Taggart seven years ago. We have, indeed, now reached the era of painless dentistry, not of the kind of which we have heard so long from the charlatan, but absolutely sincere, earnest, ethical and scientific painless dentistry. That is what Dr. Buckley has brought to you to-night, and again I am forced to say that I am pleased to be here and attest to the fact that you can rely absolutely on what he has said.

Dr. W. D. Tracy, New York City.

The paper Dr. Buckley has presented to-night is only another evidence of his devotion to his professional work. It is another contribution from him which will make us more deeply indebted to him than before.

A few days ago Dr. Hyatt was kind enough to place in my hands a small quantity of the paste and I have used it in about a dozen cases. The range of its use was quite wide within those few days, and the results obtained interested me very much. In no instance did I fail to get some result. In every instance but one I obtained the desired result, and was enabled to excavate my cavity—completing the work without pain to the patient. The cavity which gave me trouble was a shallow, cervical cavity in a lower second molar, and in endeavoring to place the paste, I perhaps failed to seal it properly in the tooth.

Dr. Buckley told me to-night that there is sometimes a failure to produce a desensitizing effect when the cavity is in such a position that the paste cannot be properly sealed in it.

Dr. Buckley has never failed us. Those of us who have used his preparations have always found them to be as he represented. We are all glad to get this paste, and I feel sure it will take an important place in the list of Dr. Buckley's preparations.

It seems a cruel fate that this splendid thing should be presented to us after some of us have equipped ourselves with hypodermic syringes, and have mastered the intricate technique of nerve-blocking and all those things which are necessary to produce local anesthesia. As for the excavation of sensitive cavities, however, it seems that the application of this paste will be unlimited when the operator has the opportunity to make the preliminary application. One of the interesting points in the paper was, that when we are ready to fill our cavity after having used the paste, we may feel assured the dentine and the fibrillæ have been thoroughly disinfected, and that the cavity is really ready for the filling.

The odontalgia caused by the use of the paste is hardly a factor. In

only one out of the twelve cases did I have any complaint, and that was a hypersensitive cavity, and the patient complained only of a discomfort in the afternoon, and not at all later, nor during the night.

This paste, perhaps, does not differ from our other remedies in that we must employ common sense in its use. I do not think we need to reckon with that element in our profession who do not act with care and with conscience, because they really do not represent the profession and may be counted on to misuse any remedy.

Dr. Buckley has made it plain that the active ingredient that does the work is the formalin in the compound.

I feel that the evening has been a most profitable one, and I want to express my personal debt to you, Dr. Buckley, and my congratulations to the society, on having received this epoch-making paper.

Dr. W. B. Dunning, New York City.

Painless dentistry has been such a will-o'-the-wisp for so many years, that the presentation we have had to-night seems almost too good to be true. I think that is the first thought that strikes us; and then on second thought, the fact that it is Dr. Buckley who presents this wonderful preparation goes a long way toward removing any misgivings which may be suggested in its use.

We are all indebted heavily to Dr. Buckley for the preparation of formo-cresol he put forth some years ago for the treatment of putrescent pulps, which practically revolutionized the treatment of those cases. All humanity has benefitted by it. From his other preparations we have gained confidence in everything he presents. Perhaps, therefore, I shall appear to you to-night like a doubting Thomas, for I have been afraid to use this preparation without knowing more about it. Dr. Hyatt kindly supplied me with a small quantity, with the request that I try it. My associate tried it in what seemed a favorable case, and the next day, by the ordinary tests, he was unable to decide on the vitality of the tooth.

Of course, we all know the diagnostic importance of pain, as Dr. Buckley has said. We must not in our every-day practice choose to proceed without pain. It is the guide-post in our work; but when pain becomes too intense, it must be relieved; hence the value of anything of this kind.

It seems to me such a remedy should be confined to the extreme cases, which means not more than occasional use. A good deal of time is lost in making the application, and where that is not justified, it is a serious disadvantage. I say this with the reservation, of course, that time is no object in cases of sufficient severity.

In the little pamphlet supplied with the remedy there is a statement

to the effect that the vitality of the fibrillæ is destroyed in the carious area, but that the remedy will not affect sound dentin to any *appreciable depth*. If it affects sound dentin at all, where will you draw the line? The amount of the application being small in any case, the variation of 1/100 of a grain may lead to a result very different from what is expected. It makes one a little uneasy to suspect there would be any permanent effect, even if hardly appreciable.

Dr. Buckley states that a "small quantity" of the paste should be sealed in. I should be glad to know more definitely what the proper quantity should be. Is it necessary for us by long experience to learn by the eye just how much—or is there a dosage which will be safe and also efficient?

I think it is always well in a discussion to bring out as many doubtful points as possible, for the sake of giving the essayist a chance to clear them up. If the prolonged dentinal anesthesia produced by Dr. Buckley's remedy will not endanger the life of the pulp, he has undoubtedly made another important contribution to dental science. I am sure we are unanimous in thanking Dr. Buckley for what he has presented.

President Stevenson. I will ask Fr. Fraser, who has had experience in having the paste used in his own mouth, to tell us what he thinks about it.

Dr. Fraser. The preparation of a cavity was begun in one of my teeth, which was very sensitive. It was a compound cavity in an upper molar. Dr. Hyatt had some of this paste, and thought it a good case in which to try it. It was sealed in the cavity for about forty-eight hours. At the end of this time the cavity preparation was completed without any pain to me. I find great pleasure in expressing to Dr. Buckley my sincere thanks for what he has done for humanity.

Dr. Rogers. About three weeks ago I was given some of this desensitizing paste, and I have been experimenting with it in all kinds of cases—cervical and buccal. There seems to be no pain, and it appears as though the tooth were dead. In the case of a little girl, the mother said there had been pain for a few hours, but it passed away, and I cut out the cavity, which had been very, very sensitive, without any pain.

We have had so many things presented to us, that it hardly seems possible—it seems like a miracle—that this should be the case. I have tested several of my cases a week after and found the teeth vital. It is a short time, I know, but we take this from whence it comes, and feel sure

it will be all right. There is nothing we have been looking for that we appreciate more than this paste from Dr. Buckley, and I am personally grateful to him.

Dr. Voelker. It is always a pleasure to pay tribute to a man who discovers a good thing and helps humanity. Within the last decade, three things have come to us, which have been of immense value—first, the gold inlay; second, the improved silicate cements, and the third, Dr. Buckley's splendid paste. I trust the men here will not forget, in speaking of this particular material, and in using it, always to associate the name of Buckley with it.

I am sorry the paper was not discussed more from its chemical side, because there are several things in it intensely interesting. For instance, it seemed strange to see the word trioxmethylin, which is a purely technical term; I hardly recognized it until I looked it up and found it was my old friend, formalin, under its technical name.

Now, Dr. Buckley, you have the neothesin, which is a white crystallin substance, the trioxmethylin, which is another colorless substance, and the thymol, which is a white substance; then you mix it with a vehicle of petroleum, which is colorless, and than you spoil it with another ingredient—analin—making it useless for me in anterior cases.

Dr. Buckley. Are you afraid of discoloring the tooth?

Dr. Voelker. Yes; that is the only thing which I can find against it in my opinion. I may say that in its use I, too, have had one hundred per cent. of successful results.

The first patient on whom I tried it—Miss W.—came to me, a new patient, very nervous and with quite a lot of work to do. The left lower molar, occlusal surface, had a cavity, and as soon as the explorer went down, the patient jumped about a foot. I tested two or three cavities which were also sensitive, and I thought this would be a good case in which to try the paste. I did so, and dismissed the patient. When she returned, I was a little doubtful, from my experience with formalin, as to what result I would get when I tested the tooth, and I went a little farther than was necessary, and found the pulp decidedly alive. I prepared both of these sensitive cavities without pain.

The next case was Mr. L., who had an exceedingly sensitive cavity, which I could not touch with an explorer, and I put in some of the paste. It was quite a deep cavity. I had some other work to do for him, and we did not get to it until two weeks after, when I could work with perfect ease.

The next case was Miss L. I removed a gold cap which had decay

under it, and sealed the paste in the cavity for two days, and the patient, as well as myself, was most enthusiastic at the results.

It is not possible for me to put in words the wonderful appreciation I feel for this valuable remedy.

Dr. Gelson. I received from Dr. Hyatt a sample of the paste. I used it in forty-six cases. The only trouble I had was in two cases. In one, there were three cavities. The patient reported a severe toothache in the right lower third molar. I removed the paste, and immediately upon removal the patient had relief. I had treated it in the morning, and she came in again at night—after about twelve hours.

In the other case I removed the paste and then could proceed.

In the other cases success was complete.

Dr. Ottolengui. In one part of Dr. Buckley's paper he said he felt almost as if he were undertaking something that was impossible. When he gave me his paste, and told me what results he thought could be obtained, it seemed to me also that he was attempting the impossible.

In the first case in which I used it, the result was so complete a desensitization of the cavity that I could hardly believe I had not devitalized the pulp; and, as Dr. Voelker said, I went on until I found I had plenty of sensation in the cavity!

I then made an experiment such as Dr. Buckley himself reported. I had a case in which it seemed to me a question whether I should or should not remove the pulp—a case in which I did not care whether I killed the pulp or not. I used the paste and found the cavity absolutely desensitized, so that I could remove all of the carious portion, and I finally uncovered the pulp, which was alive, and then with pressure anesthesia I removed it.

I have a more important report than that, however, to make to you. We have just had to-day what might almost be called a final test. A great many propositions have been given to the profession about desensitizing teeth. We have had this problem solved almost annually since I have been in the profession. We have had an overenthusiasm—and the greatest success has been obtained in cases where it was the least needed. I have long ago become so skeptical of all these agents that I had schooled myself to use methods to minimize pain as much as possible without any such agents. I have, however, been using chloride of ethyl for the last five years, but only in extreme cases. Since I have had Dr. Buckley's paste I do not recall a single instance of failure, except one, which I think was explainable on ac-

count of faulty sealing in the cavity. Even in that case the tooth was prepared with less pain than it would have been otherwise.

In the early part of last week a patient presented with this interesting introduction. I had received a letter announcing her coming and making an appointment. When she came to me she said: "Have you heard about me from Dr. Keefe?" I said, "No." "Well," she said, "I am Dr. Keefe's worst patient." I put her in the chair and found an awful condition: a splendid young woman of about nineteen, with a decalcification along the gum line of all teeth from right second molar to left second molar. This patient was most hypersensitive. I found it almost impossible in trying to make an examination to even dry out the parts, and I was surprised to find four fillings in her mouth. I asked her how that was done. She said Dr. Keefe turned her over to Dr. Buckley in Chicago. She said: "He uses a wonderful method that works with everyone except me. They thought they could use analgesia, but they were obliged to use anesthesia." She told me they had to "put her to sleep" to fill those teeth, and even then she felt it. She said: "Now they tell me *you* can do it; and I want to know if you can." I said, "I have a paste here that Dr. Buckley has gotten out especially for people like you." She said, "Well, I hope it will work, but I doubt it."

If any of you gentlemen have heard the exponents of analgesia describe it technique, you recall that they tell you they use a combination of oxygen and nitrous oxide; but in the last analysis they admit that they rely on "natural gas" to a large extent. (Laughter.)

In my opinion, that is one of the most valuable ingredients. I used all I had in the office on this young lady. I sent her away with what an eminent alienist has called "pleasurable expectations."

I found practically no large cavities, but on the buccal surface of the second molar I found a very shallow cavity, and I selected that for for this experiment. I smeared in the paste and covered it with calxine. When she came back I removed this calxine and started to prepare this cavity, and she went right up in the air. Then she said: "There is another beautiful dream gone wrong. Now what shall I do? Dr. Buckley's paste is just as bad as that analgesia."

I believe that paste had some effect, but I do not thing my "natural gas" had yet begun to affect her. She had not reached the point where she was willing to let me operate.

Now, what is pain? We say this "hurts," or that "hurts." Pain is only measurable by the person who feels it, and no matter how little the potentiality of the pain is, if the patient is so sensitive that the least touch will make her suffer, she is suffering pain, and there must be something done to relieve it. This was therefore an especially fine case in which

to test this paste. I thought I might have interfered with my results, because I had not used cotton, and that the calxine had perhaps picked up the paste.

I had not heard this paper then, and I said to her: "I believe we have not succeeded in confining the paste in the tooth. I used a certain cement, because it would be easy to remove, but it has proven too easy; now I am going to use something which will remain until next week. Dr. Buckley will be here then and we will see what he thinks." I applied the paste on a little pledget of cotton, and then put over it Ames's stickiest oxyphosphate, flowing it over onto the enamel. You can imagine what a pleasure it was to me to find the oxyphosphate still adherent to that tooth to-day, and that we had thoroughly sealed in the paste.

Dr. Buckley was present when she called to-day, and he said: "You will be able to cut that tooth." I had said to myself that I would not consider this paste a success unless it worked in this particular case. I took out the dressing and put in a little bibulous paper to dry it, and she said: "I don't believe that hurt very much." I took one of my sharpest excavators and I very gently started to do a little cutting. She said: "I don't believe that hurts very much, but I don't think I can let you go much further." I scraped out the decalcified dentine and then I took up a stone, but she balked as soon as she saw the engine. I said: "I am only going to use this to smooth the edges. Anyhow, these stones do not hurt. They only make a noise." I went around the edges and she did not move, and I prepared the cavity for a porcelain inlay.

I believe this paste is everything that Dr. Buckley claims for it. I do not think you could have a more difficult case than I have described to you, and I think I will be able to fill all this girl's teeth, though perhaps not always with only one application.

We have been told here to-night that this paste will not destroy a pulp. I prophesy that in the future even good men will report that they have destroyed pulps, but in my opinion they will be wrong. You can consult the literature and you wll find men who have said there must be arsenic in oxyphosphate because pulps have died under oxyphosphates; but the fact is, if the operators had been competent pathologists they would have removed the pulps before filling the teeth in the first place. Pulps will die which should have been taken out before this paste was put it. I shall ask any man who comes forward and says he has destroyed a pulp with Buckley's paste to read what I am saying now, and I shall then ask him if he does not think the pulp would have died and become septic if he had prepared the cavity without this paste.

The same is true when you put in large inlays. You will prepare some of those cavities painlessly, perhaps deeper than you should, and

put in a larger inlay than you should, too near the pulp, and you will blame Buckley for it, when you ought to blame yourself.

Dr. Buckley. The hour is late, and only a few points have been raised in the discussion to which it is necessary to reply; therefore I shall be brief.

I appreciate deeply the kind words that have been spoken. I do not blame anyone for being skeptical and suspicious. I would expect conscientious men, like Dr. Dunning, who had not used the paste, to be skeptical. They are the men who are the most enthuiastic after they use the remedy and learn its worth. I want to say to you that many a time I have pinched myself to see if I were really awake. I did not believe at first that the results I was getting were possible; they seemed too good to be true. That was the reason why I selected these men in whom I had confidence, wrote them letters and sent them the remedy and asked them to try it and see if it would do for them what it had done for me. I wanted to be certain of my ground before I gave the formula to the profession.

Dr. Tracy and Dr. Voelker have used the word "formalin" in speaking of the constituents of the remedy. This word "formalin" is generally used to designate a 40 per cent. solution of formaldehyd in water. Desensitizing paste contains trioxymethylen—tri, meaning three—and oxymethylin, formaldehyd, and there are three molecules of formaldehyd (CH_2O) in one of trioxymethelen $(CH_2)_3$, or, in other words, it is polymerized formaldehyd, a solid, not a gas. This as a solid form of formaldehyd, and is slowly decomposed into the gaseous formaldehyd by the heat of the body.

Dr. Voelker also says that he would prefer to have the paste without the coloring agent, for fear this might stain the tooth structure. It would have saved me a great deal of experimenting had I felt that everyone would have been of the same opinion. It was difficult to get a satisfactory color. I wish you might see the array of colors I used, ranging from red and pink to blue, green, yellow and gray. Dr. Ottolengui will remember that his first specimen was pink. Dr. Goslee's was yellow. I could not have this preparation of a pink color, for the reason that my devitalizing fibre happens to be pink. It would not do to have both of these preparations of the same color. The color which I finally adopted is a grayish-green, and it is absolutely insoluble. It is impossible for one to stain a tooth with the coloring agent in Desensitizing Paste, just as it is absolutely impossible to stain a tooth with the coloring in my devitalizing fibre; while the latter is pink, it is insoluble in the fluids of the tooth. Now, why is it desirable to have these preparations colored? Simply that one can readily see the remedy when it is

applied to a tooth. The color of the dentin is a light yellow, and the cement generally used for sealing is also white or yellow. When you apply these colored preparations to the cavity you can see them. If they were a whitish-yellow, as the gentleman seems to prefer, the average man, being in a hurry, could not see if he had it properly spread over the cavity surface and hermetically sealed it in.

Dr. Ottolengui. What you sent me first had fibre in it, but I do not see any in the later preparation.

Dr. Buckley. It is in there, nevertheless, but not in so great proportion as in some of my first formulas. I am not going to detain you longer. When my paper is published I hope you will study it carefully, and I know if you use Desensitizing Paste as suggested therein you will be as enthusiastic as others who have used the remedy, and your patients will be equally happy. I thank you.

Do you realize what it means? It means we can do better work and do it with more ease to our patients and ourselves. Our patients will no longer come to us with that intuitive dread of the dental chair that has always existed. We can conserve the vitality of our patients and of ourselves, and I believe that five years at least will be added to the active lifetime of every practicing dentist. I think I can safely prophesy this, and I believe the future will bear me out. It means also the passing of this present wave of enthusiasm which is sweeping over the country with regard to analgesia. We no longer need to give to our patients an anesthetic which will produce either partial or complete anesthesia, but can follow a saner line of procedure and one which is far safer in all cases. In conclusion, when the history of the dental profession shall have been written, I firmly believe that the name of Buckley will stand out conspicuously and prominently, and will properly be placed alongside of and with such names as Sir John Lister, Koch and Pasteur, and our own beloved Horace Wells, as benefactors of the human race.

Forty-Fourth Annual Meeting of the New Jersey State Dental Society.

The forty-fourth annual meeting of the New Jersey State Dental Society convened at Ocean Grove, N. J., on Wednesday morning, July 15, 1914. The assembly having been called to order by the President, Dr. William H. Gelston, the proceedings were opened with prayer by Rev. J. D. Bills.

This was followed by a call of the roll, after which Dr. A. E. Ballard delivered an address of welcome which entertained and was much appre-

ciated by the members present. The minutes of the previous annual meeting were then read and accepted and approved as printed in the record. Thereupon the vice-president, Dr. Walter F. Barry, assumed the chair, and Dr. William A. Gelston read the annual presidential address.

Chairman Barry. You have heard the reading of the President's address. What is your pleasure?

Dr. Arthur R. Slade. I move that a committee of five be appointed for the consideration and a report on the president's recommendations.

Dr. Fowler. I presume the president has not overlooked the fact that in order that we may take any action on this proposition concerning changes in the Constitution and By-laws it is necessary to inform the secretary at Trenton bearing on this recommendation. I would simply like to ask the president whether he has written to the secretary informing him of these resolutions embodying these proposed changes?

President Gelston. All that needed action regarding a changing of the constitution embodied in these recommendations were sent to the secretary more than ten days prior to this meeting, which according to the act or the amendment of the act, is required. Motion seconded and carried.

Chairman Barry. I will appoint the following committee to consider and report on the President's address, after which I will surrender the chair to the President.

Arthur R. Slade, chairman; Henry Fowler, C. P. Tuttle, E. W. Harlan, R. S. Hopkins.

President Gelston. (Taking the chair). Under Miscellaneous society business I will appoint the following committee to report appropriate resolutions on the death of Dr. Charles A. Meeker, ex-president and ex-secretary of our society.

G. M. Holden, chairman; Frank L. Hindle, Harvey Iredell, C. W. F. Holbrook, Joseph S. Vinson.

Dr. Fowler. It is with a great deal of regret that we have heard of the illness of one of our prominent members from Atlantic City, who is unable to be with us at this convention. I think it would be fitting, at this time, that the society send a telegram of sympathy to him and his family, expressing our regret at his illness. I refer to Dr. Joseph F. Crandell, of Atlantic City. I would also include that the same apply to Dr. Robert Wakefield, of Cranford. I therefore move that the society send to them a telegram of sympathy in their illness. Motion seconded and carried.

Secretary Forsyth. Your secretary has some resignations that the society will be required to act upon. I have received the following resignations: James S. Miller, Abraham Kuntz, John R. Westervelt, Theodore K. Hayward, Herman Fordyce, Leroy Farley, William B. Ley, L. W. Delaney, V. E. Mitchell.

Dr. Harlan. Moved, that if those members are in good standing that the resignations be accepted. Motion seconded and carried. On motion, adjourned until 8 P. M.

Wednesday, July 15, 1914, Evening Meeting.

President Gelston. First, we will have a report from the Senior Delegate to the House of Delegates of the National Dental Association. Is Dr. Charles S. Hardy present? (Dr. Hardy was not in the room.) As Dr. Hardy is absent I will call upon the Junior Member, Dr. Henry Fowler, for the report.

Dr. Henry Fowler. Mr. President, before making this report I wish to say that no doubt it should come from the Senior Delegate, but in view of the fact that he is not here I will make a short report.

Report of Delegate to the National Dental Association Meeting. Rochester, New York, 1914.

First of all, the magnitude of the work involved in bringing about such a meeting must be understood to fully appreciate the labors of the men who successfully brought the Eighteenth National Dental Convention to an end July 10, 1914.

The society was indeed fortunate in the selection of Rochester for the 1914 meeting, having as it does an ideal arrangement in the buildings and grounds of the Municipally owned Exposition Park, and an administration headed by its mayor, which is anxious to co-operate and to welcome all organizations coming to their city. The civic pride of its residents in boosting and maintaining a friendly attitude towards visitors, is Rochester's proudest asset.

While all officers and committees responsible for the 1914 meeting are deserving of the highest commendation for their untiring efforts, yet, to fail to make special mention of the work of the Rochester Local Committee of Arrangements, headed by Dr. Edward G. Link, would leave out the most frequent expression heard on the grounds and in the hotel lobbies. Dr. Edward G. Link and his co-workers have made history in the successful management of a big convention.

Briefly, there were at the service of the National Dental Association two main lecture halls, four smaller, one for moving pictures and lantern lectures, two clinic rooms larger than required and exhibit space far in

excess of that needed. In addition to the above there was a restaurant on the *"à la carte"* plan, almost in the center of the group of buildings forming the Exposition Park, which gave good service at moderate prices.

As the official program of the meeting has probably reached most of the men present it will be unnecessary to speak of it other than to say that the essays, discussions, and clinics, as well as the exhibits were of the highest order. In passing it may be of interest to note that the progressive clinic was again demonstrated as being the best way to handle this difficult problem.

The arrangement of the main offices for registration on entering the grounds, divided into separate sections for groups of States with a registration officer in charge of each, proved highly satisfactory and efficient; the total registration was not definitely announced but was estimated to be in the neighborhood of 2,000.

The plan of reorganization of the National Dental Association has been successful beyond anticipation, and President Homer I. Brown announced that the association now has a membership of more than 12,500 and that within the year the number will probably be increased to almost 20,000 by the enrollment of several State organizations that are in process of adjustment for this purpose. A reference to the official program will give details as to the States now in the Association and their delegates.

The House of Delegates, consisting approximately of 100 members from the various State organizations, convened promptly at 11 A. M. Monday, July 6th, and proceeded to Roll Call and organization. Dr. Arthur D. Black, of the Amendment Committee, presented a number of amendments to the constitution and by-laws, which were referred to various committees. Dr. H. J. Burkhart, of Batavia, N. Y., brought to the attention of the delegates the discrimination against American dentists practicing in the British possessions with reference to membership in the International Dental Congress to be held in London in August

Dr. B. Holly Smith introduced a resolution, which was adopted, authorizing President Brown to forward a protest to the British Management of the International Dental Congress. At a subsequent session of the House of Delegates ways and means were provided whereby the delegates from the U. S. A. could take care of all reputable American dentists practicing abroad in the matter of membership to the International Dental Congress.

Meetings in all departments were held promptly on time and went at once to the work in hand, thus greatly expediting the program.

A number of amendments to the constitution and by-laws were passed, but as they were mostly for the purpose of clearing up uncertain

and ambiguous phrasing the general import was not changed to any extent from the original as adopted last year. Provision for the equitable selection of the Board of Trustees was made by the formation of nine districts to have one member each, consisting of a grouping of the States and territorial possessions according to their respective membership in the National Dental Association. All state societies are to be represented in their respective groups by delegates who are empowered to nominate a trustee from their respective district to be elected by the House of Delegates as the trustee from said district as follows:

District No. 1.

Maine	1	
New Hampshire	1	
Vermont	1	1,063 Members.
Massachusetts	3	
Rhode Island	2	Dr. W. E. Boardman.
Connecticut	3	
	11	

District No. 2.

New York	9	1,421 Members.
New Jersey	2	Dr. H. J. Burkhardt.
	11	

District No. 3.

Pennsylvania	3	
Maryland	1	1,699 Members.
West Virginia	1	
Ohio	8	Dr. C. J. Grieves.
	13	

District No. 4.

Virginia	2	
District of Columbia	1	
Capital	1	
U. S. Army Corps	1	
South Carolina	2	849 Members.
Georgia	1	
Florida	1	
Mississippi	2	
Alabama	2	Dr. J. P. Hinman.
Louisiana	2	
Porto Rico	1	
	16	

District No. 5.

Michigan	4	
Indiana	4	1,700 Members.
Kentucky	3	Dr. M. L. Ward.
Tennessee	2	
	13	

District No. 6.

Wisconsin	1	1,759 Members.
Illinois	10	Dr. J. P. Buckley.
	11	

District No. 7.

Iowa	4	
Minnesota	3	
Nebraska	3	1,413 Members.
South Dakota	—	
North Dakota	2	Dr. T. B. Hartzell.
Wyoming	1	
Montana	1	
	14	

District No. 8.

Missouri	4	
Kansas	3	
Colorado	2	1,471 Members.
Arkansas	1	
Oklahoma	2	Dr. C. L. White.
Texas	2	
Arizona	1	
New Mexico	1	
	16	

District No. 9.

Washington	2	
Oregon	2	
California	4	9,987 Members.
Southern California	2	
Idaho	—	
Nevada	—	Dr. S. W. Wherry.
Utah	1	
Alaska	—	
Hawaii	—	
Philippines	—	
	11	

The name appearing with each district was duly nominated and elected and together will constitute the Board of Trustees for three years, three for two years, and three for one year; thereafter three new trustees will be selected each year. Those selected will serve as follows:

Three years—Drs. Burkhart, Buckley, Hinman.

Two years—Drs. Grieves, Boardman, Hartzell.

One year—Drs. Ward, Wherry, White.

Following the election of the Board of Trustees, the election of the officers of the National Dental Association took place and resulted as follows:

President—Dr. Don. M. Gallie, Chicago.

First Vice-President—Dr. Ed. G. Link, Rochester.

Second Vice-President—Dr. Dotterer, St. Louis, Mo.

Third Vice-President—Dr. V. E. Turner, Baltimore.

General Secretary—Dr. Otto U. King, Huntington, Ind.

Treasurer—Dr. H. B. McFadden, Philadelphia.

For the office of president the successful candidate had as his opponent Dr. Chas. C. Allen, of Kansas City, and for treasurer Dr. J. V. Conzett, of Dubuque, was the losing aspirant. All other places were filled without a second nomination. The chairmen of various committees were, as a rule, prompt and thorough in making their reports.

Special attention is called to the work of the Scientific Foundation and Research Commission, of which Dr. Weston A. Price, of Cleveland, is chairman, and whose report will appear in due time in the published proceedings of the Association.

While many in our State have appreciated the necessity and importance of the reorganization of the National Dental Association, which has made it possible for President Brown to announce a membership of 12,500 instead of the scant 1,000 of a few years ago, yet our own State Dental Society has not become a member of the National Dental Association. I strongly urge that means be taken to bring this about at the earliest possible moment in order that our State may have its full quota of representation and standing in said organization.

(Signed) HENRY FOWLER.

Dental Education of the Public Through the Newspapers.

We constantly prate about the "education of the public" in regard to dental progress. When tired of talking on this topic we utter smug dissertations upon the ethical breach committed by the man who submits to a newspaper interview. What is the logical result? With one argument we prove that the press should be utilized for educating the public, while with the other we alarm those men best qualified to write such articles as would advise the layman of the real progress made by dental scientists. Finally, having created a demand while limiting the supply, the public receives its dental education from men poorly equipped as dental teachers, or at times from dentists who desire to advertise themselves rather than to advertise dentistry.

Two of three years ago the writer induced the editor of the *New York American* to publish four articles, each a page in length, dealing with the latest achievements in dentistry. These popular articles were written by a staff reporter from sources of information pointed out by the present writer, and the reporter adhered to his agreement to omit names of individuals. But the alert newspaper man does not want that sort of "story." He wishes to publish articles written by men who are recognized as authorities; and in support of statements the modern editor demands the signature of the writer. As the authorities in dentistry are forbidden to write for the newspapers, we cannot blame the newspaper man if he obtain his dental article from some other source.

The Supplement of the Sunday edition of the *New York American* is also issued with the Hearst papers in Boston, Chicago and San Francisco, while many of the articles are "syndicated" to Sunday newspapers in other large cities.

The following highly educational article appeared in the *New York American* Supplement on Sunday, November 8th, and together with its widespread publication in other newspapers probably was available for reading matter for about four million individuals. As it was signed by Leonard Keene Hirshberg, A.M., M.A., M.D. (Johns Hopkins), it has probably been accepted as a true bill against dentists:

Dentistry According to Hirshberg.

"Thirty years ago, before the discoveries of Pasteur, Koch and Lister that decay, fermentation, ulceration, abscesses, diseases, sores, blood poisoning, boils, erysipelas and decomposition are all caused by tiny, little living microscopic plants and animalculae, it was the custom to have one's teeth pulled out at almost the slightest sign of the black spot of decay.

"To-day, a generation later, teeth are still pulled out joyfully by many dentists. True enough, a few teeth are nowadays conservatively filled. But, for the most part, the merry murder of your feelings and the racking of your jaw bones still goes blithely onwards. Even the use of local anesthetics assuages not the after sensation of an aching void and a yawning chasm in the gums.

"Medical methods have progressed—organs are transplanted, even bones are sewed together as neatly as a woman's skirt; yet the science of dentistry has moved as slowly as a tortoise. The thirty years which have passed since the discovery of bacteria as the cause of decay have left little impression upon it. Not only are there comparatively few dentists who are personally aseptic themselves or who sterilize their instruments, but, like barbers, they practice the same errors now which thy perpetrated in the seventies.

"Dr. Wren H. Oliver, of London, and his colleague, Dr. H. A. Barker, protest in an emphatic manner against the all too-prevalent practice of pulling teeth and replacing them with false ones. They say that among some of the older dentists and a large portion of the public there appears to be an impression that nothing can be done either to prevent diseases of the teeth or to cure them when they have been once incurred

"As a result of over thirty years' experience it is their opinion that it is no less criminal to extract a tooth because it is in an ulcerated or broken-down condition than it would be to remove an eye to get rid of a cataract. Yet you are continually hearing of poor unfortunates who have submitted to the extraction of all their teeth to be cured of gum disease.

"Dr. Oliver has been protesting for years against the malpractice of quack dentists, and has viewed with horror the wrecked mouths of the poor deluded people who have been induced to part with all their teeth to make way for wretched substitutes. It is deplorable, he says, that nothing can be done to suppress these pests of society.

"There can be no doubt, says Dr. Barker, that the wholesale extraction of teeth has become almost a craze.

"Not long ago a lieutenant of the Royal Navy Reserve went to him in despair about a lameness of his knees, which had refused to yield to treatment at the hands of several distinguished surgeons. At last the surgeons supposed the real cause had been found in inflammation of the lining of the teeth. Several teeth, sound and unsound, were accordingly taken out. But the knee, instead of getting better, grew worse.

"On careful examination Dr. Barker found that the patient had a badly dislocated cartilage. He had the man anesthetized, replaced the cartilage, and he rapidly recovered. But he is now minus several teeth which he ought never to have lost.

"Dr. Oliver even goes so far as to maintain that with the new knowledge of asepsis, antisepsis disinfection and local as well as the internal use of citrate of soda with hexa-methyl enetetramine—a drug which breaks up into formaldehyde inside the human tissue—it should seldom be necessary to extract teeth from a person whose general health is good.

"This teeth-pulling fetich has become a superstition—a tradition handed down from long before the time of the Pharaohs, says Drs. Barker and Oliver. Dentists, like barbers, never get away from the things told them by their masters. Those masters, as journeymen dentists, receive the errors in perpetuity from their masters in turn.

"The facts that have come to dentists in recent years, like those which are available for barbers, are too often utterly ignored. Teeth are jerked out at the slightest provocation, when, according to these London professors, ninety-nine per cent. of them, if treated the same as a skin ulcer or a boil, could be saved to their possessors."

Printed with the above is a really good diagram showing first, a section through a tooth disclosing a carious cavity, a putrescent pulp, and an apical abscess; and, secondly, the same, with root canal correctly filled, the cavity stopped with an inlay, and the abscess cured, so that the illustration at least furnished a true picture of modern dentistry.

Can We Control Newspaper Dentistry.

It is not the purpose of this editorial to defend the dental profession from the assertions of Dr. Hirshberg, but rather to arraign the dental profession for so conducting its affairs that Dr. Hirshberg would write, and a prominent newspaper editor receive for publication, an article which so grossly misrepresents the facts. It is odd, too, that Dr. Hirshberg should cite two authorities, both Englishmen, probably writing of conditions existing in their own country, and accept these foreigners' views as fairly picturing dental practice in this country. The article is doubly peculiar since at the recent International Dental Congress prominent English dentists sounded a

word of warning against the "prevalent practice of trying to save all teeth, however diseased," the discussers arguing that in view of the proof offered that many body diseases have their initiation in tooth root infection it is a hazardous procedure to attempt the salvation of diseased teeth unless there be at least more than a reasonable hope of success.

This, however, is aside from the present question. The problem before us is: "How are we to prevent or control the publication of misleading literature in connection with dentistry?" If we cannot permit volunteer efforts in this direction, then is it not the duty of our local State and National societies to appoint men to serve as a press committee? If in each locality we might have a wideawake, virile writer, who might prepare articles for the newspapers and reply to such misleading communications as this of Dr. Hirshberg's, dentistry, dentists and the public at large would quickly benefit. Are we too ethical or too squeemish or too cowardly to do this?"

Correction.

When errors occur in any publication, it is customary for the editor to cast the blame upon the proof-reader, while the proof-reader passes it on to that convenient mythological individual, the printer's devil.

However, certain errors occurred in the November number of ITEMS OF INTEREST in connection with which the editor feels that at least he should divide the responsibility with the aforesaid devil. In Dr. Kirk's discussion of the paper by Dr. Corwin there are several typographical errors, which our readers have undoubtedly detected, and for which we beg to be forgiven; but the principal mistake is the use of the word "katol," which should have been written "skatol," and we particularly call attention to this, with regret, because it may seem to some to be a chemical error on the part of Dr. Kirk, instead of an error in proof-reading. It is only fair to Dr. Kirk to say that neither copy of his discussion nor proof was submitted to him, as at the time he was in Europe.

National Dental Relief Fund.

Office 63 Trumbull St.

To the Members of the National Dental Association:

The favorable response which you made last year in the introduction of a Christmas Seal, as a means to increase our Relief Fund, was most gratifying to your committee. Realizing as we did that we were in a degree following the course of another organization, yet we felt assured, inasmuch as we were working for the same purpose, the relief of our suffering brothers, we should be, as we were, sustained by your liberal endorsement and contributions in excess of the number of Seals sent you. We were handicapped last year, first by delay in having our designs satisfactorily printed, then by stoppage by the Postmaster General and much clerical expense, so that we were unable to get the Seals into the hands of our members until about the first of December. However. with all these disadvantages, we brought our fund up to $9,620. Profiting by experience, this year our expense will be nil, and the Seals can now be had at the Dental Supply Houses or from this office.

The necessity for a Relief Fund is made more manifest by repeated appeals to your committee by members who are suffering for the necessities of life. Surely we should this year by our large increase in numbers, easily increase this fund by purchase of Seals, and annual contributions which we are about to solicit, up to a sum not less than thirty thousand dollars. Then from accrued interest we could begin to respond to these calls from our unfortunate, and it is no exaggeration when we say suffering members. Brothers, a little from each will accomplish this much-desired ideal. Will you do it?

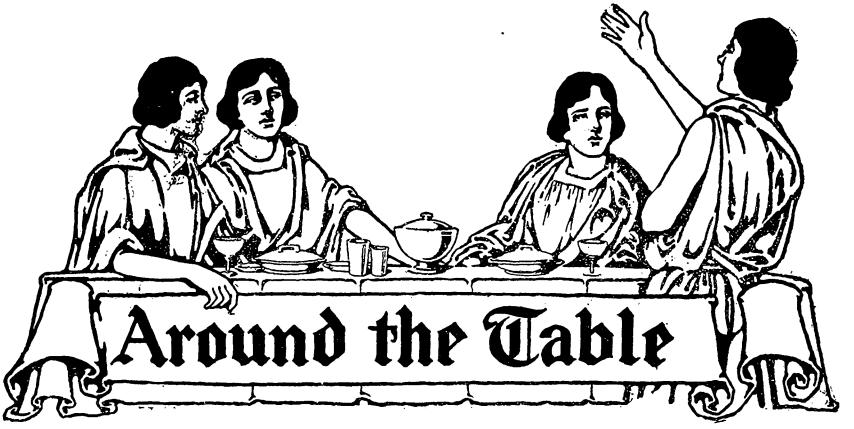
In sending your order to this office, make all checks payable to National Dental Relief Fund, as your check becomes a receipt, saving expense in acknowledgment.

Fraternally yours,

L. G. NOEL, W. T. CHAMBERS, JAMES MCMANUS.

E. S. GAYLORD, Chairman.

National Dental Relief Fund Committee.



IT IS WORTHY OF NOTE that the S.D.D.S. has held two monthly meetings thus far, and that in each case the attendance was from thirty to fifty in excess of the actual membership, which is not a bad record. By the way, I should explain that S.D.D.S. does not stand for "Some D.D.Ses," but means "Second District Dental Society," "of New York" being understood. Note that "S.D.D.S." reads backward and forward the same, which implies that harmony is the actuating impulse among the members and that whoever at the moment may be the officers, they enjoy the unqualified support of the others. This is as it should be if a society intends to accomplish anything.

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IT WAS AFTER THE November meeting, and a few genial and congenial spirits gathered in one of the cosy corners of the Crescent Athletic Club. The other fellows ordered Scotch whiskey, French vermuth, Russian vodka and Munich beer, but, being neutral myself, I had only a glass of Saratoga Springs water. As you will be interested more in what was said, rather than in who said it, I will omit real names, and identify the members of this dental conference by the nationality of the drinks they drank.

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THE TOPIC FOR discussion at the Society's meeting had been the pathology of the dental pulp and treatment of root canals in general. At the club conference the Scotch person started the talk with this riddle: "Why is a talk Around the Table, like this, similar to a blind abscess? No! Don't try to guess, because in the first place you can't, and secondly, if you do, you deprive me of the pleasure of telling you. Answer: Because just as the germs of disease from a blind abscess may infect the entire physical body, so the germs of truth uttered here to-night by such brilliant thinkers as ourselves, when accurately reported and printed in the journal of our Spring-water drinking friend, may affect the entire professional body of dental workers. Do you see?"

"I SEE PERFECTLY," said our French friend, "but when you use the expression 'brilliant thinkers,' why so immodest as to include yourself? No! Don't apologize. We know it was thoughtlessness, which shows you are no brilliant thinker. But let us see what sort of an observer you are, or, better still, let us apply the test to all of us. We attended a meeting to-night and heard a lot of talk on a pretty old subject. Did we hear anything especially new, important or worthy of wide publication? Let each recall, if he can, one or more points that may have impressed him, and we all can talk it over."

"THE SUBJECT," said the German, "was old, of course, but considering what we are learning nowadays from men like Grieves, Hartzel and others, there is scarcely any topic in dentistry more important than root-end disease. Therefore, any practical points that we can get out of a meeting like that of to-night cannot be too widely disseminated. For my part, I think the essayist gave us a splendid and timely paper, and that there were a number of good suggestions, which even though not entirely novel, were rather better put than I ever heard before."

"TALK LESS AND SAY MORE," interjected the Russian. "What in your opinion was the most useful advice given by the essayist?"

"WELL, I PARTICULARLY approved of his recommendations and specimens showing how to enter root canals," replied the German. "You recall that he declares that sooner than leave the root canal improperly cleansed and filled, he would sacrifice the entire crown in order to gain suitable access to the entrances thereto. At the same time he pointed out that the more natural tooth tissue one could preserve without militating against the thoroughness of the root canal work the better for the patient. He advised that the cavity proper should, if possible, always be prepared in such a way that the axial walls should directly approach and be continuous with the walls of the root canal. Another very important point was his very forcible argument against using burs or other cutting instruments upon the floor of the cavity, since if left in its natural condition there always is a funnel-shaped depression leading directly into the canal orifice. Personally I was as pleased as I was surprised by his exhibit of specimens showing cavities prepared so that perfect access to the canals was obtained, yet the cavities themselves were extremely small. Much smaller, in fact, than I make them myself."

"I AGREE WITH ALL that you have said," commented the Frenchman, but you must remember that in this, as with many other clinics, out of the mouth it was much easier to get access to all those canals, holding the tooth in your hands and twisting it as you please for admitting light and operating your instruments than it would be in actual practice in the mouth. Nevertheless, it was a good point to bring out, especially for the benefit of the younger men, because by showing them the minimum cavity through which it is possible to accomplish thorough root work it should render them less hasty in making radical extensions of cavities

❖ merely for personal convenience. The patient is entitled to retain as
❖ much as possible of that part of his tooth which is non-carious."

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"THAT WORD, NON-CARIOUS," said the Scotchman, "brings us to another
❖ phase of this question. All those specimens shown to-night were pre-
❖ pared in non-carious teeth. Working on sound teeth it is quite easy
❖ to cut ideal cavities, with walls leading directly into the canal orifices,
❖ and with a floor having funnel-shaped depressions indicating just where
❖ the orifices are. But, unfortunately, the major part of the demand for
❖ root work occurs in carious teeth and often the caries has already
❖ obliterated these funnel-shaped land-marks on the cavity floor. Again,
❖ in older teeth, where secondary dentine has accumulated, the cavity
❖ orifices are not only very obscure, but often so attenuated that they are
❖ hard to find at all."

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"THAT REMINDS ME," said the Neutral, "of a rather good suggestion
❖ made in my hearing lately by Dr. Hyatt. He said that in such cases
❖ he swabs the floor of the cavity with a pledget of cotton saturated with
❖ iodine. Next, with clean cotton he wipes the iodine away. But usually
❖ the iodine penetrates the orifice of the canal so that after the cavity
❖ floor has been wiped clean, each canal opening shows up as a dark dot,
❖ and a fine bristle then easily enters the canal proper."

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"THAT SOUNDS LIKE a good trick," said the Russian, "and I shall cer-
❖ tainly try it, and, by the way, Prof. Starr in the discussion to-night de-
❖ scribed another little method that sounded good to me. I have noticed
❖ that a great many essayists point out that medicaments sealed into a
❖ canal should really be sealed in if we are to get full benefit from them;
❖ and they then declare that gutta percha does not sufficiently well seal
❖ up the cavity. But Dr. Starr to-night, I think, proposed a good scheme
❖ when he recommended filling the cavity with gutta percha, then chilling
❖ the gutta percha and removing it, and then dipping the cavo-surface in
❖ eucalyptus and replacing it, the eucalyptus softening the gutta percha
❖ sufficiently so that it adheres to the cavity walls, thus making a perfect
❖ seal."

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"THAT IS ALL very well," said the Frenchman, "when the cavity is
❖ shaped that the gutta percha can be easily withdrawn. But often there
❖ are undercuts, and you could not remove the gutta percha after chilling it."

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"YOU OUGHT TO BE demoted to the infant class," said the German. "The
❖ withdrawal and replacing of the gutta percha is not the important factor;
❖ it is the use of eucalyptus to cause the gutta percha to adhere to the
❖ cavity walls that really improves the sealing quality of the filling. In
❖ a case where the filling cannot be withdrawn whole, I would think that
❖ the results could be attained by wiping the walls of the cavity with
❖ eucalyptus before introducing the gutta percha."

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"DID YOU HEAR someone ask the essayist," said the Russian, "what sort
❖ of air he used for drying out his canals? then when the essayist replied,

❖ 'Just ordinary, everyday air,' the same man asked, 'How do you sterilize
❖ it?' I thought that was rather good myself. So much had been said
❖ about making the operation aseptic that one would hardly think it cor-
❖ rect practice to inject 'ordinary, everyday air' into the canal, because
❖ 'ordinary, everyday air' usually contains 'ordinary, everyday bacteria.'"

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"OH! FUSS AND FEATHERS!" exclaimed the Frenchman. "If ordinary,
❖ everyday air is good enough to be breathed into our lungs, it ought to
❖ be good enough to blow into a canal of a tooth. Besides, I think the
❖ essayist made a very good reply when he said that he used the air to
❖ dry out the canal at the moment after flooding it with alcohol, and that
❖ only enough air is used to accomplish this purpose. Thus, even if bac-
❖ teria should enter the canal with the air, they would enter a sterile field
❖ in which they could not propagate, especially as a moment later the
❖ canal would again be closed with an antiseptic root filling, antiseptically
❖ introduced."

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"THAT, OF COURSE, IS TRUE," said the Scotchman, "but why take a
❖ chance? What is the harm in sterilizing the air? Did you ever see a
❖ bacteriologist make a culture? Before dipping his platinum loop into
❖ the bacterial mass he passes his platinum loop through the Bunsen
❖ flame, thus destroying positively any bacteria that may be on the loop.
❖ In similar way I use an ordinary chip blower for drying out a canal,
❖ but I squeeze the rubber bulb together and then place the nozzle of the
❖ syringe in my Bunsen flame and allow the bulb to expand slowly. The
❖ air is thus heated and sterilized at the same time. In doing this, of
❖ course, only one blast should be used in the canal before returning the
❖ nozzle to the flame. This may not be necessary, but surely it can do
❖ no harm."

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"I WAS PARTICULARLY impressed," said the Neutral, "with the discus-
❖ sion of Dr. Van Woert. He pointed out that the mouth is usually
❖ pregnant with bacteria of many sorts, and that in using the rubber dam
❖ and rubber dam clamp, as ordinarily applied, without aseptic precautions,
❖ it is not impossible that the patient might be infected, the clamp breaking
❖ the soft tissues, and the bacteria finding entrance in this manner. At
❖ all events, I like his technique."

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"WHAT WAS HIS TECHNIQUE?" asked the Frenchman. "I missed that.
❖ I was talking to my neighbor."

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"I HAVE NOTICED," said the Neutral, "that when others are discussing
❖ a paper you usually are talking to your neighbor. And let me tell you
❖ something. When your mouth is open your hearing usually is impaired.
❖ Because when sound is coming out of the mouth, sound cannot enter
❖ the ears."

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"QUITE SO," retorted the Frenchman. "Now let me tell you something.
❖ I have noticed that when your mouth is open sound may come out of it,
❖ but very little sense."

"QUIT QUARRELING, CHILDREN," interposed the Russian. "Let our sober spring water friend tell us Van Woert's patent process for preventing infection when applying the rubber dam."

"OH! I WOULD NOT GO SO FAR as to claim that it prevents infection," said the Neutral, entirely ignoring the Frenchman and his gibe. "Nor do I think Van Woert would. But we call ourselves dental surgeons, and it is our duty to take all the precautions against bacterial infection of the patient usually practiced by a surgeon, or which would be practiced by a real surgeon operating in our field. I understood Van Woert to say that before applying the dam he cleanses the parts about the necks of the teeth with surgical soap (an antiseptic soap) and then paints the gums with iodine. Then he uses a five per cent. carbolized vaseline for lubricating the holes in the dam itself. This certainly seems rational."

"YES, IT IS RATIONAL ENOUGH," said the Scotchman, "and I am sure I would like to feel that when I perform a root canal operation I could be assured that the whole procedure could be aseptically conducted. Yet I must confess that infection may enter through so small a gateway that I cannot but feel that it is a discouraging undertaking."

"WE ALL MUST FEEL that way at times," said the Neutral, "and for that very reason we should omit no precaution, however unimportant it may seem. I doubt very much that we can always be assured of an absolutely sterile field and a perfectly aseptic operation when dealing with root canals, but of late I have adopted a method which at least eases my mind somewhat. Aside from boiling instruments in the steam sterilizer, I also have a formaldehyd sterilizer. On one tray of this I keep all instruments used for root canal work, and when ready to operate, the tray containing the canal instruments are brought to the chair direct from the sterilizer. Here, waiter! Bring a glass of spring water all around, and we will adjourn. It is one o'clock A. M. and I am seven miles from home." (Resolution carried unanimously.)

National Society Meetings.

AMERICAN INSTITUTE OF DENTAL TEACHERS, Ann Arbor, Mich., January 28-30, 1915.
Secretary, Dr. J. F. Biddle, 517 Arch St., N. S., Pittsburgh, Pa.

PANAMA-PACIFIC DENTAL CONGRESS, San Francisco, Cal., 1915.
Secretary, Dr. Arthur M. Flood, 240 Stockton St., San Francisco, Cal.

The Panama Pacific Dental Congress.

The Committee of Organization of the Panama-Pacific Dental Congress wishes it distinctly understood that the Panama-Pacific International Exposition will not be postponed, but will open on time, as will also the Panama-Pacific Dental Congress.

At the present time matters relating to the Panama-Pacific Dental Congress are most encouraging. The attendance so far as can be judged by those who attended the meeting of the National Dental Association in Rochester, and the meeting of the New Jersey State Dental Society, will break all previous records. Everyone said he was coming, and the Committee of Organization wishes to assure all prospective members that they will be well cared for in every way.

Papers and clinics by some of the most noted members of the dental profession have already been contributed to the program. A large portion of the available exhibit space has been taken by manufacturers and dealers, and the success of this part of the congress is positively assured.

The new Municipal Auditorium in which the congress will be held is being rapidly completed, and will afford facilities for this congress such as no other similar meeting has enjoyed. It is centrally located, and

may be reached by numerous street car lines from the Exposition Grounds, or any hotel in San Francisco, in from five to twenty minutes.

The San Francisco Hotel Bureau, with offices in the Flannery Building, San Francisco, will look after the reservations for hotel accommodations for our guests. We earnestly advise all those who intend to attend the congress to make their reservations early. Many congresses will be held in San Francisco during the months of August and September, 1915, and many will be in session at the time of the meeting of the Panama-Pacific Dental Congress, and for obvious reasons the reservation of rooms should not be delayed.

Sympathy for Dentists in the War Zone.

Whereas, The members of the Second District Dental Society, of the State of New York have learned with deep interest of the distress and hardships which have been brought to our confrères because of the European war; therefore be it

Resolved, That this society expresses its deepest sympathy for all members of the dental profession, affected by the war, regardless of nationality; and be it further

Resolved, That this society would gladly co-operate in any movement which would in any way alleviate the distress or difficulties of any of those whom we look upon solely as brother workers in a common cause; and be it further

Resolved, That copies of these resolutions be sent to the dental magazines and the associated press, with the request that they be published.

Kings County Dental Society.

The Kings County Dental Society very cordially invites the members of the dental profession to the meeting of this society held on Thursday evening, December 10th, at 8:30 P. M., in the Masonic Temple, Lafayette Ave. and Cleremont Ave., Brooklyn. Dr. Weston A. Price, of Cleveland, will deliver an illustrated talk on "Some Recent Researches and Their Significance to the Dental Profession." The work of the committee, of which Dr. Price is chairman, is of such great practical value that every dentist is urged to make this meeting a very hearty expression of their appreciation of the wonderful accomplishments of Dr. Price.

Dr. Alonzo Milton Nodine, Secretary.

1 West 34th Street, New York City.

Pennsylvania State Board of Dental Examiners.

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, December 9, 10, 11 and 12, 1914. The examination will be held in Musical Fund Hall, 808 Locust Street, Philadelphia, and in the University of Pittsburgh, Pittsburgh. Application blanks can be secured from the Department of Public Instruction, Harrisburg. For other information, address the secretary.

ALEXANDER H. REYNOLDS.

4630 Chester Avenue, Philadelphia.

Idaho State Board of Dental Examiners.

The next meeting of the Idaho State Board of Dental Examiners for the examination of candidates will be held at Boise, Idaho, commencing Monday morning, January 4th, at 9 o'clock. For application blanks and particulars write to

ALBERT A. JESSUP, Secretary.

Box 1414, Boise, Idaho.

Arkansas State Board of Dental Examiners.

The Arkansas State Board of Dental Examiners will hold an examination at the Goldman Hotel in Fort Smith, Arkansas, on December 28th and 29th (Monday and Tuesday). Applications and fees should be in the hands of the Secretary two weeks before the examination.

For further particulars address the Secretary.

I. M. STERNBERG, Secretary.

Fort Smith, Arkansas.

Florida State Dental Society.

At the annual meeting of the Florida State Dental Society, held at Atlantic Beach Hotel, Atlantic Beach, Fla., July 1, 2 and 3, 1914, the following officers were elcted for ensuing year:

W. E. Van Brunt, Tallahassee, president; R. C. McClellan, Ft. Meade, first vice-president; O. R. Cheatham, Jacksonville, second vice-president; A. M. Jackson, Lakeland, recording secretary; Alice P. Butler, Gainesville, corresponding secretary; F. S. Robinson, Jacksonville, treasurer. Executive Committee: Jesse L. Williams, Jacksonville, chairman; W. K. Bradfield, St. Petersburg; A. M. Jackson, Miami; D. B. Morris, Gainesville; M. C. Izler, Ocala.

ALICE P. BUTLER, Cor. Secretary.

Gainesville, Fla.

Chicago Dental Society.

The annual clinic of the Chicago Dental Society will be held in the Hotel La Salle, January 29 and 30, 1915.

The officers and committees are planning a program for this meeting which they feel sure will be of interest to every dental practitioner who can arrange to be in Chicago at this time.

T. L. GRISAMORE, President.

P. B. D. IDLER, Secretary.

American Medico-Pharmaceutical League.

Signatures to Subscriptions.

A regular monthly meeting of the executive committee of the American Medico-Pharmaceutical League occurred on the evening of September 28, 1914, at 451 Forty-seventh Street, Brooklyn, N. Y.

After the election of new members, Dr. Brothers, the corresponding secretary, announced that he took pleasure in reporting that 331 (three hundred and thirty-one) new members, had been elected in the past seventeen months.

The following letter from the New York State Department of Health was read and filed:

(*Brooklyn Eagle,* September 29, 1914)

"In reply to your letter of September 12th, regarding the interpretation of the Boylan law, I beg to state that this department has held, that the signature of a physician upon every prescription calling for the drugs whose use is restricted by this act, shall be signed with the Christian or first name in full, the initial of the middle names, if there be any, and the surname in full—for example, a doctor named John David Smith, should sign John D. Smith, not simply J. D. Smith. Any prescription must necessarily state the name and amount of each ingredient called for therein. The druggist is required to write upon his prescription the name and address of the purchaser actually making the purchase, and the date upon which sale is made. Before the enaction of this law, it was provided by Section 237 of the public health law that a drug is misbranded if the package fails to bear a statement of the percentage contained therein by volume of alcohol, and by quantity or proportion, of morphine, opium, heroin, chloroform, chloral hydrate, acetanilid, cannabis indica, or any derivative or preparation of any of these substances. This provision is in no way repealed or superseded by the Boylan law, and by this provision misbranding is made a misdemeanor."

SAMUEL F. BROTHERS, M.D., Cor. Secretary.

96 New Jersey Ave., Brooklyn, N. Y.

Association of Military Dental Surgeons.

The following officers of the Association of Military Dental Surgeons were elected for the coming year:

Dr. Wm. C. Fisher, president, 373 Fifth Avenue, New York City; Dr. John D. Milliken, 1st vice-president, San Francisco, Cal.; Dr. Wm. H. Ware, 2d vice-president, San Francisco, Cal.; Dr. Chas. J. Long, secretary, Rock Island, Ill.; Dr. R. W. Waddell, treasurer, New York City.

Indiana State Dental Association.

The next annual meeting of the Indiana State Dental Association will be held on the 18th, 19th, 20th of May, 1915. A distinctive feature of this meeting will be that the program will be made up exclusively of Indiana dentists. A cordial invitation is extended to members of other dental societies to attend the meeting.

A. R. Ross, Secretary.

Lafayette, Indiana.

Montana State Board of Dental Examiners.

The Montana State Board of Examiners will hold a session on the second Monday in January, 1915.

Butte, Montana.

Dr. G. A. Chevigny, Secretary.

Items of Interest

A Monthly . . . Magazine of Dental Art, Science and Literature . . .

Published by Consolidated Dental Manufacturing Co. 130, 132, 134 Washington Place; 187, 189, 191 West 4th Street, New York . .

Subscription, $1.00 per year
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Canada $1.40 per year.

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Vol. XXXVI. No. 12
December
1914

R. Ottolengui,
M.D.S., D.D.S., LL.D.
Editor
80 West 40th St.
New York

Exclusive Contributions

Orthodontia

Society Papers

Society Discussions

Contents—Continued

Subscription, $1.00 per year, in advance, to United States, Mexico, Cuba, Panama and other American territorial possessions. Canada, $1.40. Other countries, $1.75. Single copies of this issue, 15 cents (Domestic).

Subscriptions received at any time, to date from January or July. Orders taken by all leading dental dealers. Advertising rates made known on application. Remittances preferred by registered letter, postal money order on bank draft.

Notification of change in address should be made on or before the 10th of the month, in order to have change made in time for the following month's issue.

Address all business communications to Consolidated Dental Mfg. Co., Publishers, Nos. 130, 132, 134 Washington Place; 187, 189, 191 West Fourth St., New York.

Communications for publication department should be addressed to the Editor, R. Ottolengui, M.D.S., D.D.S., LL.D., 80 West 40th St., New York.

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In effect beginning December 1st, 1914

RETAIL QUANTITY RATES

Teeth with Headed Platinum Pins		$25 Lots	$100 Lots	$300 Lots
Plain Vulcanite	$ .20	.19	.18	.17
Gum Vulcanite	.26	.24 7/10	.23 4/10	.22 1/10
Teeth with Long Platinum Pins. (Facings)				
Saddleback Teeth for Crown and Bridgework Plate Bicuspids and Molars for Metal Work Flatback Teeth for Crown and Bridgework	.27	.25 6/10	.24 3/10	.22 9/10
Gum Plate Teeth for Metal Work	.29	.27 5/10	.26 1/10	.24 6/10
Combination Teeth				
Combination Sets (6's Platinum Pins, 8's Pinless), 14	1.52	1.44 4/10	1.36 8/10	1.29 2/10
Combination Sets (12's Platinum Pins, 16's Pinless), 28	3.04	2.88 8/10	2.73 6/10	2.58 4/10
Standard Assortment No. 25	26.00			
Standard Assortment No. 50	54.88			
Standard Assortment No. 100	110.81			
Diatoric Teeth, Plain Vulcanite, each	.04	.03 8/10	.03 6/10	.03 4/10
Metalite Teeth				
Per set of 14	.75	.71 2/10	.67 5/10	.63 7/10
14 Sets for	10.00			
37 Sets for	25.00			
80 Sets for	50.00			
165 Sets for	100.00			
Standard Assortment No. 25	25.00			
Standard Assortment No. 50	50.00			
Standard Assortment No. 100	100.00			
Davis Crowns				
Each	.40	.38	.31	.30
Without Pins	.35	.33	.26	.25
$50 lots, per Crown without Pin	.30			
Standard Assortment No. 1 with Pins	35.00			
Standard Assortment No. 2 with Pins	100.00			
Standard Assortment No. 2X with Pins	100.00			
Special Laboratory Assortment No. 3 with Pins	500.00			
Case of Every Numbered Mold of Davis Crowns, each	15.00			
Goslee Teeth				
Without Pin, each	.35	.33	.26	.25
Standard Assortment "A" without Pins	30.00			
Standard Assortment "AX" without Pins	30.00			
Standard Assortment "B" with Pins	100.00			
Standard Assortment "BX" with Pins	100.00			
Special Laboratory Assortment "C" with Pins	500.00			
Case of Every Numbered Mold of Goslee Teeth, each	15.00			
Miniature Sets	.50			
Giant Teeth	.50			

(Continued on Following Page)

Davis Crown Pins

Straight

Regular Metal—all sizes	$ .05
Clasp Gold—small	.50
Clasp Gold—medium	.55
Clasp Gold—large	.65
Platinum Iridium—small	1.05
Platinum Iridium—medium	1.15
Platinum Iridium—large	1.40
Gold-Plated—all sizes	.10

Split

Regular Metal	.10
Platinum Iridium	1.60
Gold-Plated	.15

Offset

Regular Metal—all sizes	.10
Clasp Gold—small	.50
Clasp Gold—medium	.55
Clasp Gold—large	.65
Gold-Plated—all sizes	.15

Goslee Tooth Pins

Regular Metal (for Rubber Work only)	.05
Platinum Alloy	.30
Platinum Iridium	.65

Lots of.....$26.31	Lots of.....$111.11	Lots of.....$352.94
5% 1.31	10% 11.11	15% 52.94
$25.00	$100.00	$300.00

Davis Crowns, Goslee Teeth and Combination Teeth in Trays and cabinets, and METALITE Teeth, at quantity rates, can be included to make up an order of teeth under this schedule, but they are not subject to the quantity discounts, as their list price already includes a reduction for quantity.

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Deposit accounts for $100 opened upon deposit of $95.

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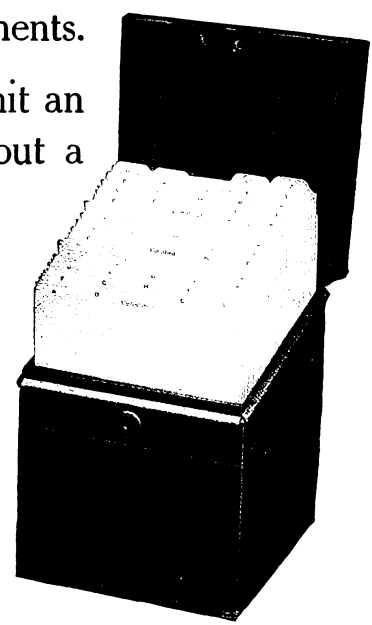

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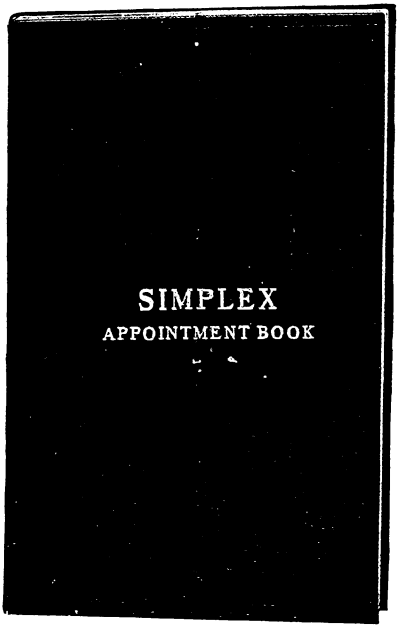

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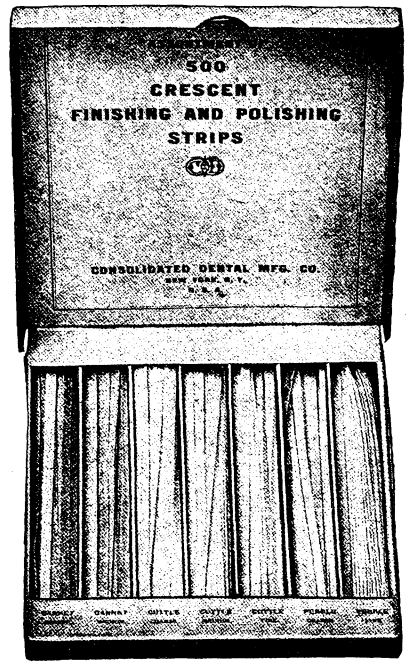

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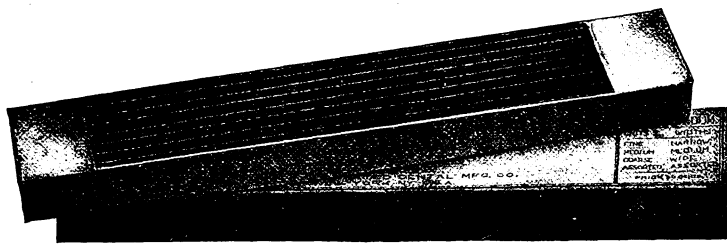

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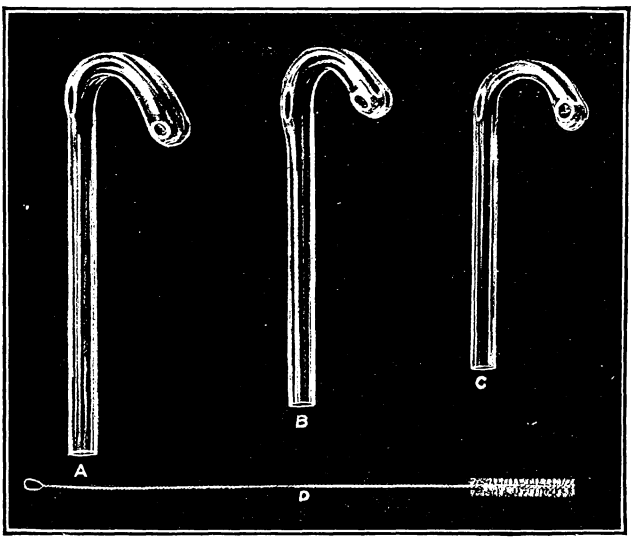

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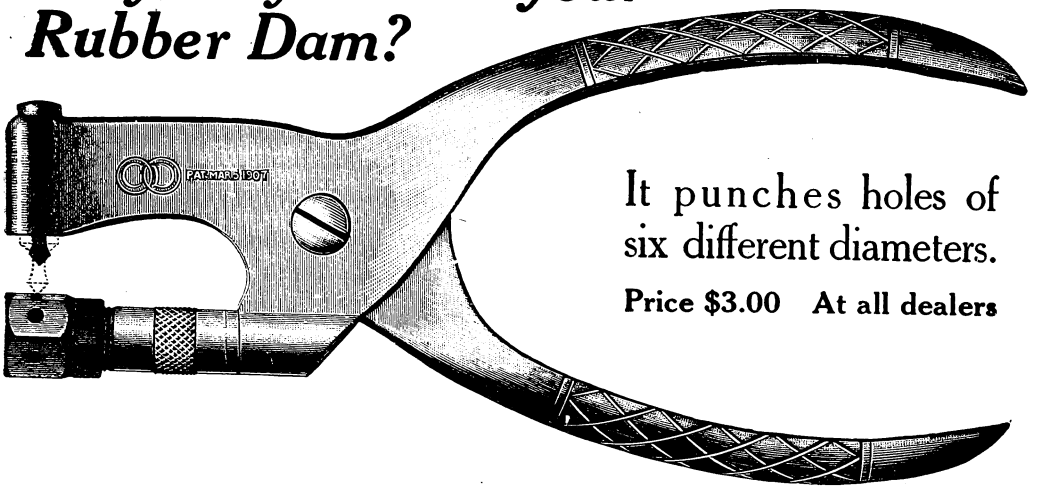

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You lose 50 cents on the dollar on account of the waste.

Rubber Dam will not rip or tear if punched with round holes; punched by the

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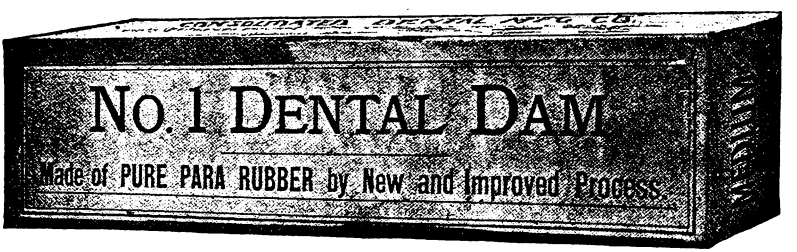

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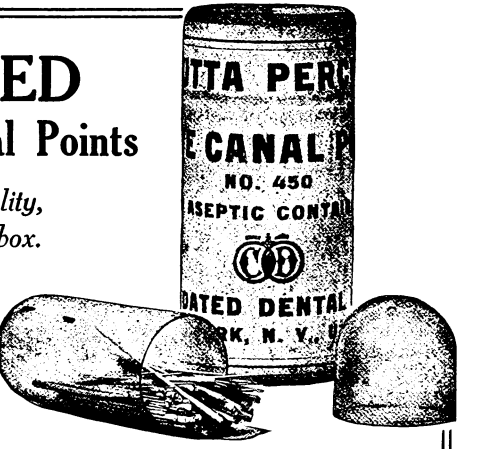

THE container is transparent. Every point can be seen without opening it. Therefore you can make your selection of the desired shape and size without spreading the points out on a table and contaminating them. A single point can be withdrawn without even touching any of the others. No matter how fine and hair-like the point may be, it is tough and will not crumble, permitting the operator to insert it to the very end of the canal where it is most needed.

Colors, Pink, White. Sizes, Large, Medium, Small and Assorted. Per Box, 30c.

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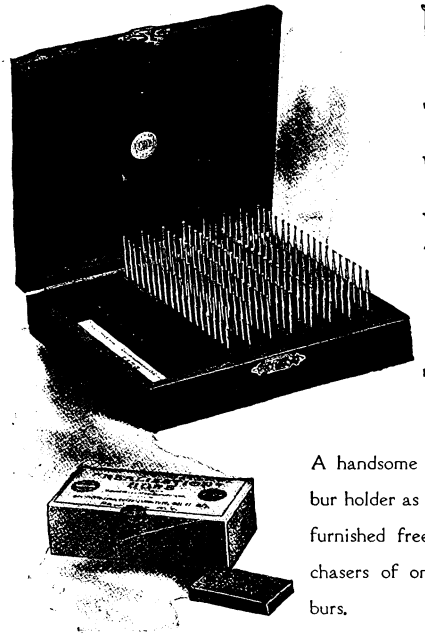

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do not chatter.
do not heat rapidly.
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are smooth and quiet cutters.
are the least painful to the patient.
shave dentine rapidly and smoothly.
make excavation comparatively easy,
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save your hand piece.

A handsome mahogany bur holder as illustrated furnished free to purchasers of one gross of burs.

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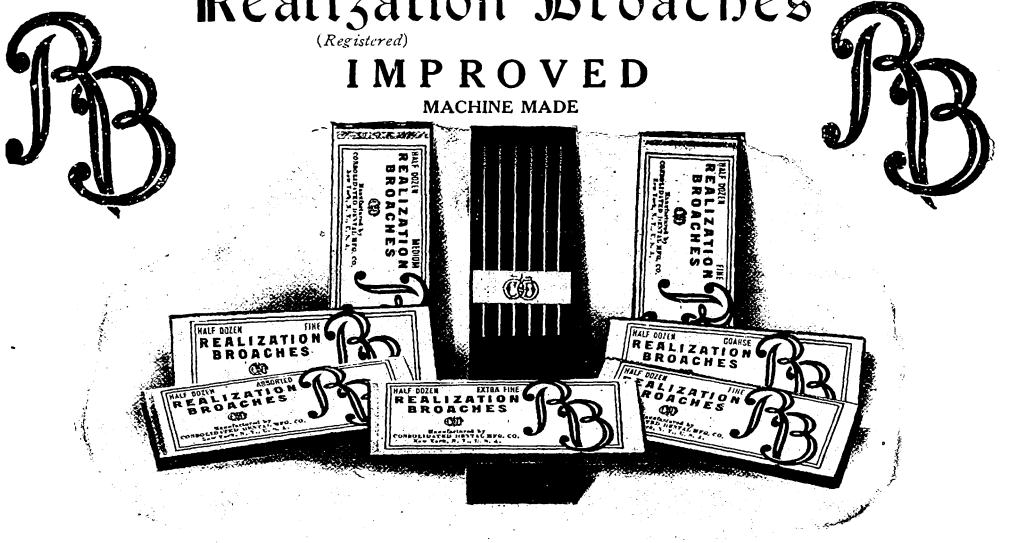

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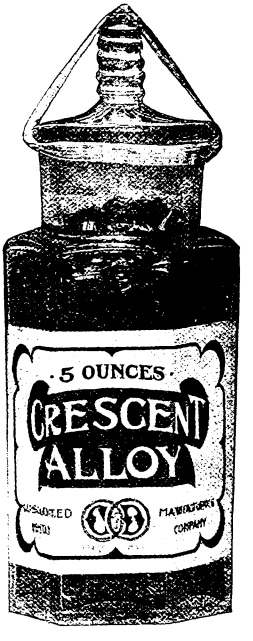

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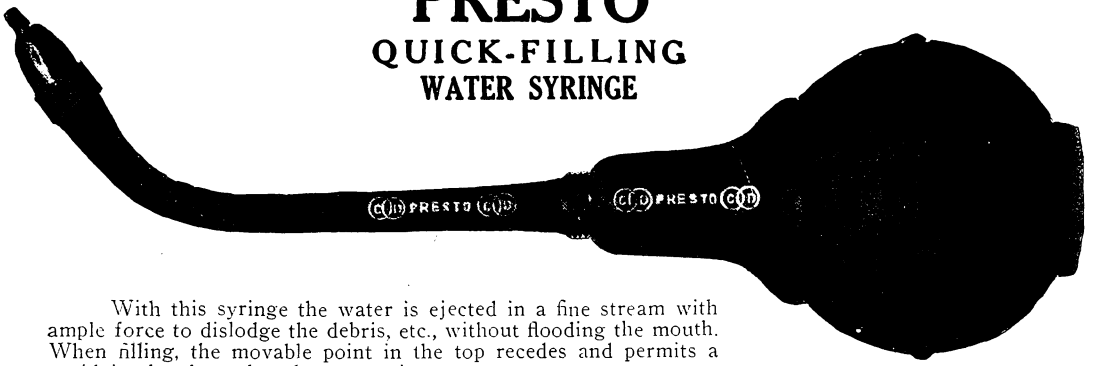
PRESTO
QUICK-FILLING
WATER SYRINGE



With this syringe the water is ejected in a fine stream with ample force to dislodge the debris, etc., without flooding the mouth. When filling, the movable point in the top recedes and permits a rapid intake through a large opening.

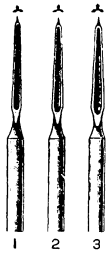
The bulb is powerful and fast and all the parts are simple and strong. By using a specially designed bulb and stem, there is no leakage between these parts, and no wires or other makeshift attachments are required to hold the bulb on the stem.

None of the parts is interchangeable with those of other makes.

Price, . . . $1.00

CONSOLIDATED DENTAL MFG. CO.

The Davis Crown Reamer



The Davis Crown Reamer enables you to fit the Davis Crown Pin as accurately as if the metal was poured into the root. The Reamer removes the minimum of tooth structure, and a root thus prepared corresponds exactly with the shape of the Davis Crown Pin, which fits into it perfectly its entire length. The Reamer and Pin are made for each other. For successful Crown Fitting use the Davis Crown Reamer.

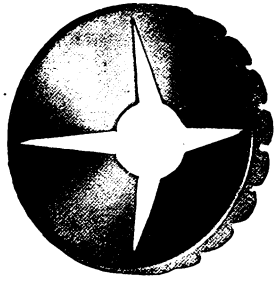
Made in three sizes to correspond with the three sizes of Davis Crown Pins.

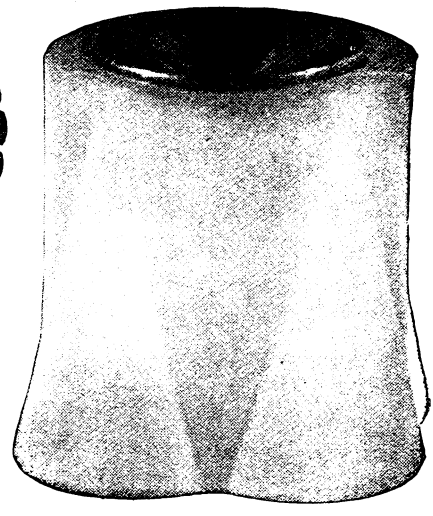
PRICES

Each . . . . . $ .35 Per set of 3 . . . $1.00

CONSOLIDATED DENTAL MFG. CO.

Consolidated Aseptic Glass Waste Receiver



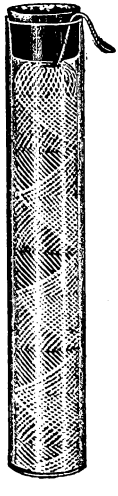


Simple, cleanly, sterilizable, handsome, modern and very useful.

The metal cap is the only removable part; it is sterilizable and unbreakable.

Price 50c. each

Consolidated Ligature Silk

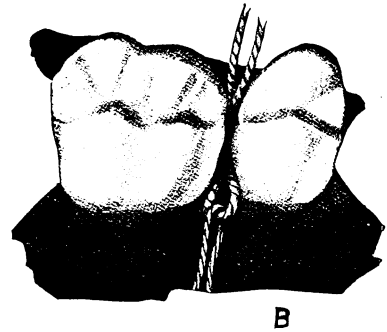


For Orthodontia and separating of teeth.

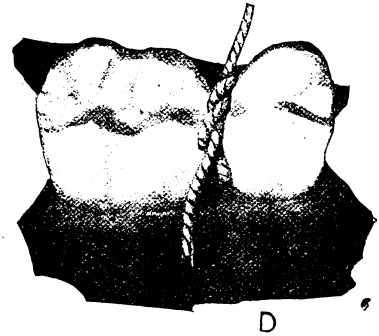
This is specially made dental silk with unusual properties which make it efficient for separating of teeth, when it becomes wet. Its remarkable self-acting tension and strength is not found in any other silk of such fine gauge. The inside wind permits withdrawal without tangling or twisting.

Fine, Medium and Coarse, equivalent to 25, 23, 21 B. & S. in Glass Tubes.

PRICE PER TUBE
Fine, Medium or Coarse—25c. each



B



D

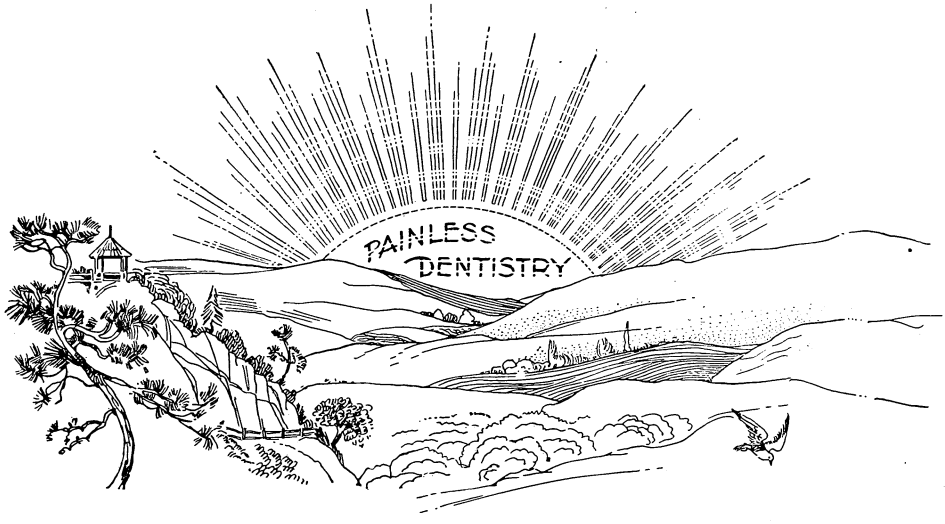
Its application is as follows: Cut a piece of Consolidated Ligature Silk of suitable size about 10 or 12 in. long. It should be passed between the teeth beneath the point of contact. A simple method is shown in illustration B, using a piece of floss silk as a leader. This can be used as a single or a double strand as desired. The Ligature Silk should be tied tightly around the points of contact as shown in D. The absorption of moisture will then cause the loop or knot to contract against the contact points, thus forcing the teeth apart.

The above applies especially where teeth are in contact at the approximal point.

CONSOLIDATED DENTAL MANUFACTURING CO.

If You Want Porcelain Teeth with Pins That Will Not Come Out Ask for Teeth with Baked-In Pins

All Consolidated Teeth are made with pins baked-in, the method which has been used for all good teeth for scores of years and which has been proved correct by actual use in the mouth for generations.



IT PAYS TO BE MODERN

in your methods of practice.

Patients know the difference.
Painless Dentistry IS HERE.

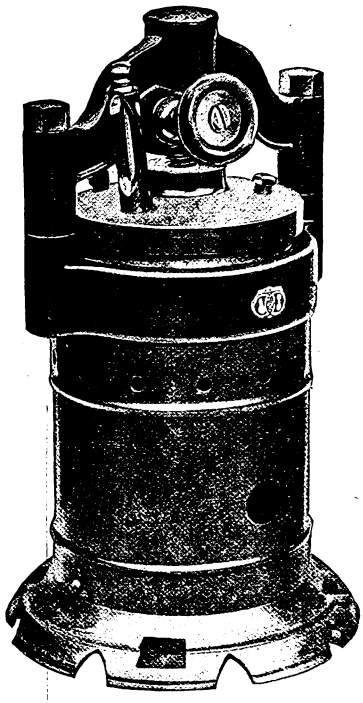
SUBSCRIBE FOR ITEMS OF INTEREST

and know what the latest innovations of modern dentistry are and learn how to apply them to your every day practice.

Price, $1.00 per year. **3 years $2.50.**

SUBSCRIBE THROUGH YOUR DEALER.

CONSOLIDATED DENTAL MFG. CO.



The Consolidated Vulcanizer

Patented

It is the only vulcanizer with a simple, easily handled, pressure equalizing, non-leaking cover and embodies many highly important advantages which the dental profession has sought for years.

A turn of the knob tightens the cover and makes it steam-tight all around. By means of a simple worm and gear a turn of the knob transmits great pressure on the cover. We have adopted a floating type cover in which provision is made to take up any inequality in the thickness of the packing, by which the cover is made absolutely steam-tight all around.

Send for Booklet

P R I C E S

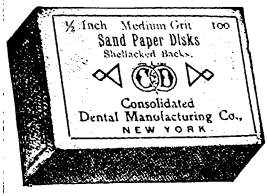
2 Case, for Gas, Kerosene, each	$30.00
3 Case, for Gas, Kerosene, each	32.00
2 Case, for Alcohol, each	32.00
3 Case, for Alcohol, each	34.00
Alcohol Stove with Jacket	4.00
Bracket for Holding Timing Attachment, each	2.00
Timing Attachment and Gas Regulator, Complete, each.	8.00
Timing Attachment, Separate, each	4.00
Gas Regulator, Separate, each	5.00
Improved Siphon for Gas Regulator	1.25

Consolidated C&D Dental Mfg. Co.

No. 73

Paper and Cloth Disks for Polishing

Made in Sand Paper, Carborundum, Cuttlefish, Emery Paper, Garnet Paper and Crocus Paper



These disks are uniformly made of selected, high grade material and clean cut, with smooth shellacked backs. Charged on one side only. They are strong and durable and are made to resist disintegration by saliva or liquids. The grit is sharp and firmly set, and dentists will find their work easily accomplished.

Sizes—⅜, ½, ⅝, ¾, ⅞ inch. Grits—Fine, Medium, Coarse. ¾ inch size and medium grit is always sent unless otherwise specified.

PRICES

Box of 100 ..... $ .10
12 boxes 1.00

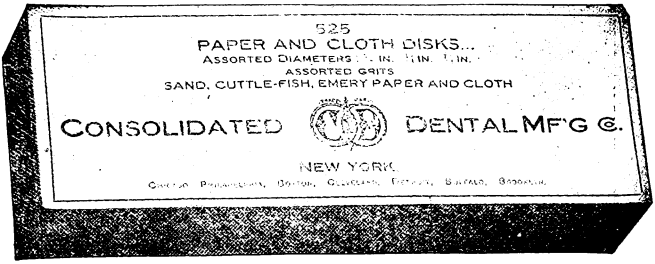
No. 74

In boxes of 525 disks each. Sizes—½, ⅝, ¾ and ⅞ inch.

Each box contains Sand Paper, Carborundum, Emery Paper, Cuttlefish, Garnet, Crocus Paper and Emery Cloth.

Grits—Fine, Medium, Coarse, Extra Fine and Assorted. All neatly divided in six compartments.

Price, per box..... $ .50



EXCHANGES

EXCHANGES

NOTE.—RATE for advertising in this department of ITEMS OF INTEREST is five cents per word, including captions, "Wanted," "For Sale," "Exchange," etc., and address. Initials charged as words. Minimum charge per advertisement, $1.00. Rate for agency advertisements is ten cents per word. Advertisements should reach us by the 15th of the month to insure insertion in the following month's issue, and are payable in advance.

CONSOLIDATED DENTAL MFG. CO., Publishers, 130 Washington Place, New York, N. Y.

Note.—Rates for ads in these columns 5c. per word. Minimum charge per ad $1.00.

6955—FOR SALE—Ethical practice and up-to-date electrically equipped office. Terms reasonable if sold before January 1st. Dr. G. E. Petty, Portsmouth, Virginia.

6956—University of Pennsylvania graduate is desirous to associate himself with an ethical practitioner in New York City. Four years' experience; character and habits unquestionably the highest. Address "Ambitious," care ITEMS OF INTEREST, 130 Washington Place, New York.

6957—WANTED PARTNER—Practice of over $10,000 cash per year, in a growing city of 90,000. For information address "Good," care ITEMS OF INTEREST, 130 Washington Place, New York.

6958—FOR SALE—At inventory modern office and equipment; fine residence district, north side Chicago. Good reasons for selling. Address T. F. W., care Consolidated Dental Mfg. Co., 29 E. Madison St., Chicago, Ill.

6959—Young lady assistant and secretary; qualified to fill position with busy ethical practitioner in Manhattan, who requires one capable of taking responsibility. Address, No. 6959, care ITEMS OF INTEREST, 130 Washington Place, New York.

6960—Third year college man wants position. Ten years in business for self. Expert laboratory worker and dental salesman, good operator at chair, married, excellent habits. Prefer college town, reason, would finish course. Have complete outfit, operative and laboratory. Ready January. Address, No. 6960, care ITEMS OF INTEREST, 130 Washington Place, New York.

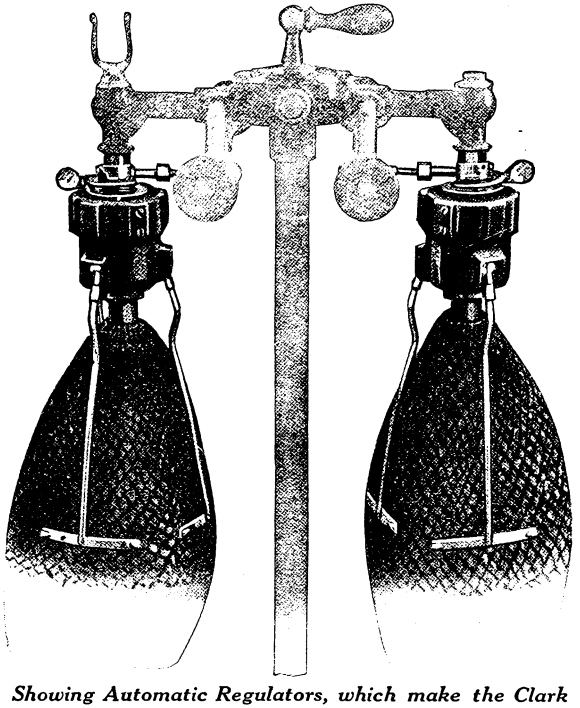
6961—An experienced dentist accustomed to refined and select clientele desires position with ethical practitioner. Further particulars will be given upon application. Position must pay not less than $50.00 a week. Address, C. D., care ITEMS OF INTEREST, 130 Washington Place, New York.

6962—DENTISTS ATTENTION—Opportunity of a life time. Large income. Small investment. Write quick. Dr. Thacher, Republic, Wash.

6963—FOR SALE—Dunlop Pyorrhea Machine. Address Consolidated Dental Mfg. Co., 45 West 34th Street, New York, N. Y.

6964—WANTED—First-class mechanical man to take impressions and general charge of laboratory; salary no object; only sober, industrious married man, registered in Pennsylvania, need apply. Address, D-5, care Lee S. Smith & Son Co., Keenan Bldg., Pittsburgh, Pa.

New Clark Automatic Regulators



Showing Automatic Regulators, which make the Clark

THE OUTFIT WITH BRAINS

These self-acting Regulators, responding to internal impulse, mechanically do what you now physically do.

They embody a *new* and *original* principle. No diaphragms.

They are self-regulating, maintaining a positive pressure and volume at all times. Eliminate all noise.

As the vapors are inhaled, the bags are spontaneously replenished. A big economy.

The Outfit absolutely runs itself.

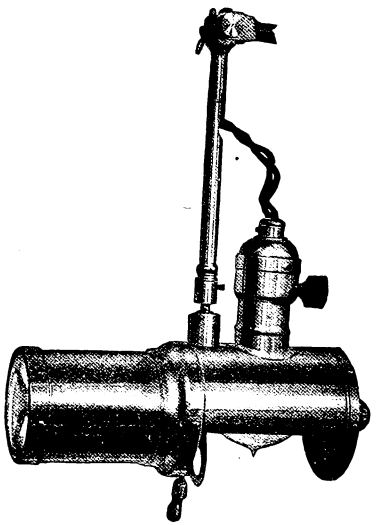
They can be easily attached to any New Model Clark Outfit. Send for complete illustrated folder.

Nearly 1,000 Dentists have sent us outlined statistics, regarding their experience with N_2O and O. These statistics mailed to you upon request.

A. C. CLARK & CO.

Grand Crossing CHICAGO, ILL.

Fitted With Mazda Lamp Without Advance in Price



Patented { May 3, 1904. Dec. 20, 1910.

The price of the 1915 Lewis Illuminator with Mazda Lamp, 105 to 125 Volt, or 220 to 250 Volt is $12.00.

Without Lamp, to take any lamp you may select, $11.50.

Bracket, $3.70 extra.

Ask for Booklet 2 on
ELECTRIC MOUTH ILLUMINATION.

The 1915 Lewis Illuminator has an enlarged cylinder so a globular Tungsten Lamp, 3⅛ inches diameter, is accommodated. This is a stock globular lamp of the Mazda type and is available in voltages between 105 and 125, or between 220 and 250. It can be obtained at Electrical Supply Houses and is known as the G 25 Mazda. For all other voltages we furnish the best lamp the market affords.

There is no necessity in this Illuminator for a special expensive lamp as the relation and focus of the lenses to each other and location of the lamp to the lenses admits of a less powerful lamp being used, at the same time producing a circle of light free from any objectionable feature.

The workmanship is "B. D. M. Co." all through. The entire Illuminator is made in our own factory with the exception of the lenses and lamps. With special jigs, fixtures, punches and dies we have produced, we think, the most perfect Illuminator in workmanship and efficiency of any yet devised.

Three finishes are supplied.

FINISH No. 1, Ferro-Nickel, black. Ferro-Nickel yields an intensely black and smooth surface, preferable in many ways to any other finish, being more lasting and not readily tarnished. Strongly recommended.

No. 2, Oxydized Copper. Oxydized Copper is the usual spotted finish.

No. 3, Full Nickel Plated. Full Nickel should be ordered for use in connection with white enamel outfits.

Buffalo Dental Manufacturing Company

BUFFALO, N. Y., U. S. A.

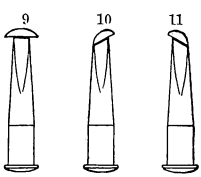
Save Your Time and Make Your Work Easy

by the use of the

HARPER HOLDER AND CLEAVERS

The rubber covered shank rests upon the teeth and pries the enamel off; and the cleaver points turn in the socket of the holder to reach ALL SIDES AND ANGLES OF THE TEETH.

The proper preparation of the roots for banded crowns and bridgework is made possible for the operator of average skill by the use of this instrument; AND THIS IS THE REAL SERVICE FOR WHICH PARTICULAR PATIENTS WILL PAY.



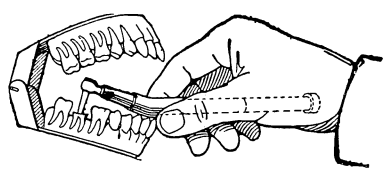


FIG. 3

Harper Holder with Cleavers, Nos. 9, 10, 11 . . . . **$3.00**
Cleavers: Universal, No. 9; Right, No. 10; Left, No. 11 Each, **35c**

THE UNIVERSAL TRIMMER

Is made with a very thin flexible blade for carving wax inlays, amalgam and cement fillings. *It is the only instrument with which you can carve every surface and margin of all teeth.* The thin blade turns in its socket and the contra angle form of the shank makes a perfectly balanced and universal carving knife or trimmer.

(The above cut is two-thirds size)

Universal Trimmer with Blade **$1.50**
Blade **50c**

The purchase price will be refunded if a trial of these instruments is unsatisfactory.

Draft, Express or Money Order must accompany all orders.

DR. WM. E. HARPER

MANUFACTURER OF

Harper's Quick Setting Alloy .· The Harper Holder and Cleaver Points
The Universal Trimmer .· and Inventor of the Contra Angle Hand Piece

3441 Michigan Avenue **Chicago, Illinois**

GENERAL UTILITY PACKAGE

$4.50

THE DUNLOP PYORRHEA MACHINE

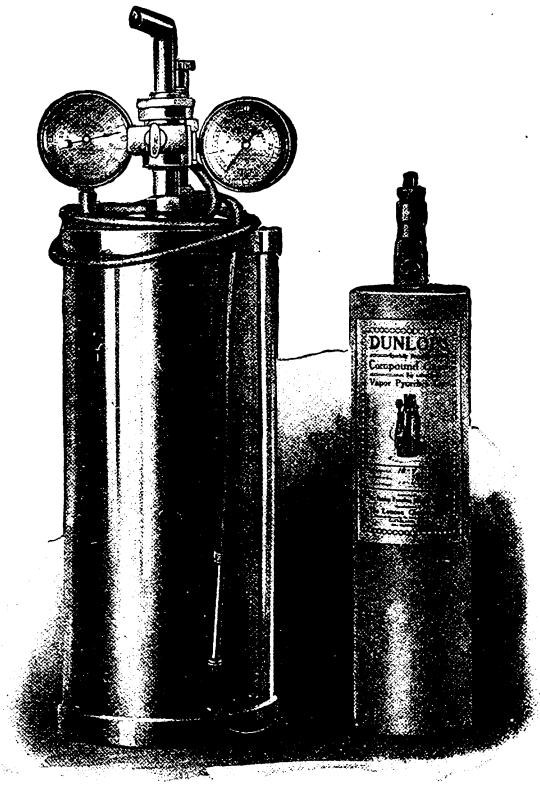
for the production of Ethyl Borate Gas in the treatment of pyorrhea.

THE DUNLOP PYORRHEA PASTE,

a de-hydrating substance and tartar solvent.

THE DUNLOP ETHYL BORATE,

to be converted into a gas in the machine, and also used as a mouth spray and wash.



THE DUNLOP POCKET PACKER

for the protection of deep pockets or ulcerated surfaces around the teeth, during treatment.

The Dunlop Pyorrhea Machine Mfg. Co.
24 East 48th Street
New York, N.Y.

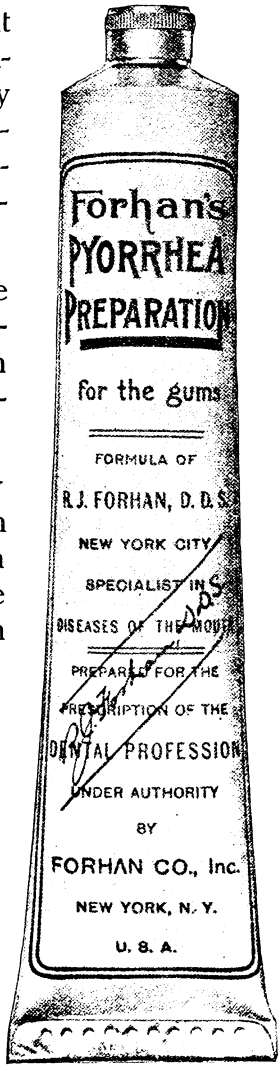
Satisfied Dentists! Satisfied Patients!

Actual size, $2 per bottle

The Forhan Treatment of Pyorrhea Alveolaris affords satisfaction—

To the Dentist, because it leads to results which cannot be obtained so well by any other mode of treatment. It enhances his prestige as a successful practitioner.

To the Patient, because he can trace a steady improvement in his oral condition from the first administration.



Actual size, 50c. per tube

Many of your fellow practitioners freely acknowledge the superiority of the Forhan Treatment combining their instrumentation with the use of Forhan's Astringent at the chair and Forhan's Pyorrhea Preparation (paste) by the patient at home.

A fair trial will convince YOU.

Forhan's Pyorrhea Preparation (paste) may be prescribed through druggists, but the liquid-Forhan Astringent is on sale through dental supply houses only.

NO SAMPLES

FORHAN COMPANY, Inc.

325-331 Lafayette St. **NEW YORK**

FEAR! FEAR! FEAR!

of pain in the dental chair drives more people away from the Dentist than all other causes combined.

Mr. Dentist, do you realize that all dental operations can be performed painless by producing the analgesic stage, with our Local Anesthetic?

With ODONTOLINE, you can grind down the most sensitive teeth, excavate dentine, remove a live pulp and your patient will suffer no pain.

There is no question but that pain keeps many a dollar away from your office. You can ask the average person and they will tell you that it is not the expense of the operation they object to but the fear of pain. If you can eliminate this you will double your business.

1 Oz. Odontoline..... $ .50
5 " " 2.00

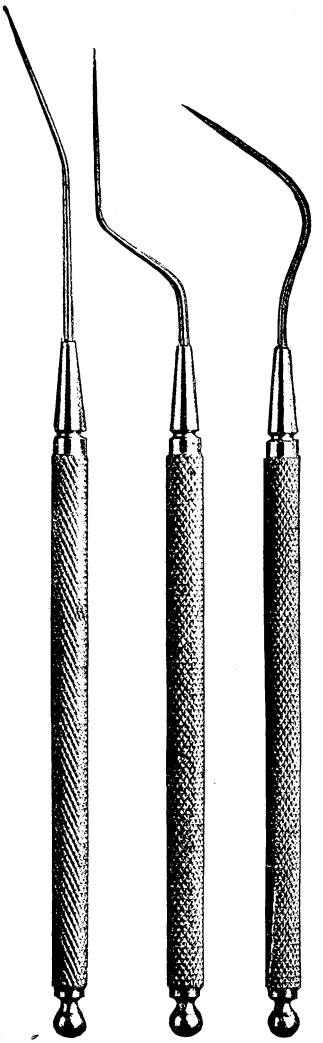
For sale by all dealers. Sample ounce, 25c.

We have just gotten out a new circular which describes the use of ODONTOLINE in producing the analgesic stage. Let us mail you one.

T. M. CRUTCHER DENTAL DEPOT

BOX 686, LOUISVILLE, KY.

THE M. L. RHEIN ROOT CANAL PICKS



The usefulness of these picks will be readily suggested for opening and enlarging root canals clear to the apex without danger of piercing the side of the root.

Price, each ..... **35 cents**
Per Set three **$1.00**

Abrasive Cutter

Nos. 1 and 2

For Replacing Broken Facings

No. 1 No. 2

THE pins are removed from the tooth selected to replace the broken facing, by keeping any abrasive powder under the copper point of No. 1, which has a hole in the center that fits over the pins in the tooth, and revolving rapidly in engine or lathe soon cuts the porcelain from around the pins; they will then drop out. It is the powder that does the cutting; keep this always under the point.

No. 2 is to countersink the hole.

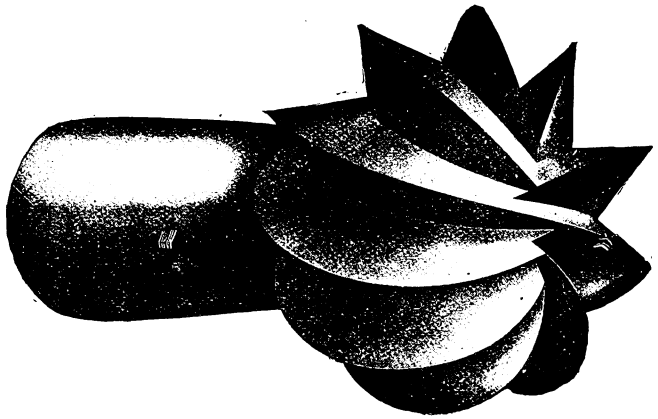
Cement to place over the heads of the pins that are already in bridge.

PRICE, each - 50 cents.

J. W. IVORY, Manufacturer

21 N. 13th Street, - - Philadelphia, Pa.

If You Are Not Using Cutwell TRADE MARK Burs You Are Unfair to Yourself



BECAUSE—Each blade is razor sharp over entire extent of edge, and the edge of each blade comes just to (not over or below) the circumference—the wear is evenly distributed and fine efficiency obtained.

BECAUSE—One long blade is continued across the head, establishing a drill and enabling the bur to cut rapidly, head on, with light pressure, also serving as a leader to draw the other blades to their work.

BECAUSE—Long blades with a sharp pitch and deep smooth valleys, give perfect clearance with the minimum of friction; it is friction that produces heat and pain.

BECAUSE—The blades ride in continual contact, each smoothly advancing the cut of its leader, with little pressure and without chatter.

BECAUSE—The steel and temper combine to produce an edge which will not turn and burnish over, even under high speed or against hard surface.

BECAUSE—The pitch of the cutting edge is preserved in use and the bur continues to shave instead of to scrape and grind.

¶ Tooth structure is such that a correctly designed and properly cut and tempered bur may be nearly glass-hard, but such a bur must be used with that delicate fineness of touch so dear to the skillful operator.

¶ Properly used Cutwell Burs are ideal. Cutwell Steel has staying qualities. Cutwell Burs are perfect in design, construction and temper. They will do more work with less effort—**Earn more per dollar invested, add more to reputation, than any other.**

PRICES	Doz.	½ Gr.	Gr.
Nos. ½ to 7, Round; 11½ to 18, Wheel; 33½ to 40 Inverted Cone....	$1.00	$5.50	$10.00
Nos. 55½ to 62, Flat-End Fissure; 502 to 507, Cross-Cut Round.....	1.25	7.00	13.00
Nos. 8 to 11, Round; 557 to 562, Cross-Cut Flat-End Fissure.....	1.50	8.00	15.00

From your Dealer—if you insist—or Direct

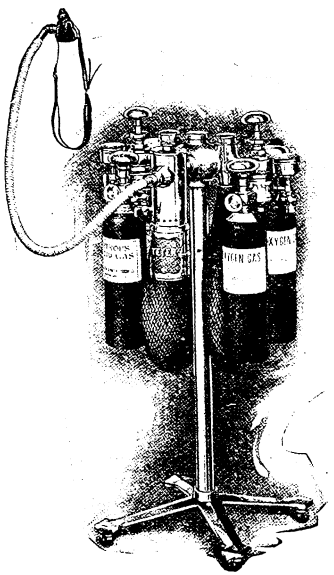
The Ransom & Randolph Co.
TOLEDO, O. U.S.A.

Try our Assortment No. 1 and you will know—1 Gross in Revolving Case $10

No Dental Office is Complete

Without

A Teter Gas-Oxygen Apparatus



A DENTIST can prepare several times as many cavities and do so painlessly, with the aid of our gas outfit, as he can in the usual way without one.

¶ Regulators are built in the head of apparatus to reduce the high pressure of the gases from the cylinders, which thereby enable the operator to get the same gentle, even steady flow of warm gases at all times.

¶ In analgesic work *No Assistant is Necessary* because the apparatus runs as it is set.

For extractions, our outfit is in a class by itself

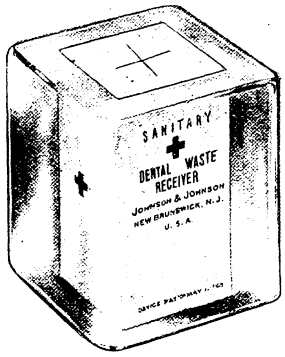
Send for catalogue and literature

THE TETER MFG. CO. - Cleveland, Ohio

New! "1914 Model"

Sanitary Dental Waste Receiver

(Johnson & Johnson)



The new glass base which encloses the carton its entire height, adds weight, stability and appearance to it and perfects what has *always been conceded to be the best.*

The Sanitary Dental Waste Receiver is an achievement in cleanliness and convenience that is inexpensive. Nothing to tarnish. Always bright and clean. The same cardboard carton with self-closing opening held within a glass standard.

The pledget of cotton or bibulous paper after use is deposited in the carton, the cross-cut opening at top disengaging it from the pliers. No emptying and cleaning. *Burned with contents after use.* Replaced by a clean carton. No infection of instruments from previous operations as with other waste receivers.

Price, as heretofore, glass standard with six cartons..... $0.50
Additional cartons flat, packages of fifty..... .50
" " " " " five hundred 3.75

Sold by leading Dealers in Dental Supplies in every country in the world.

JOHNSON & JOHNSON
New Brunswick, N. J., U. S. A.

"KELENE"

(Pure Chloride of Ethyl)

FRIES BROS., Mfrs.
92 Reade St., New York

for

Local Anaesthesia

also as adjuvant to Ether in General Anaesthesia

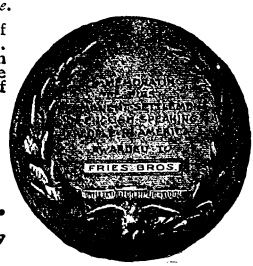
See Gold Medal Awarded

Entirely harmless. Free from all dangerous after effects. Easily applied. No irritation of the system from *injection of drugs.* Avoids use of the hypodermic needle.

Automatic Tube No. 34, Price $1.10
Graduated Tube No. 70, Price $1.60

Sent on receipt of price.

Doctor: Save yourself risk, time and trouble. Save your patients from discomfort. All may be avoided by the use of **Kelene.**



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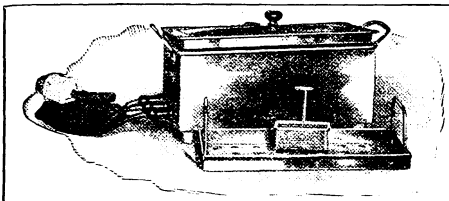

The Prometheus Electric Sterilizer

NOW HAS A PROTECTIVE DEVICE

NO RUNNING DRY. 5 YEAR GUARANTEE.
ASK YOUR DEALER
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IN

PYORRHEA

We invite the careful consideration of the dentists to the merits of Sal Hepatica in the treatment of Pyorrhea, in Constipation and Auto-intoxication, and to its highly important property of cleansing the entire alimentary tract, thereby eliminating and preventing the absorption of irritating toxins and relieving the conditions arising from indiscretion in eating and drinking.

Write for free sample.

BRISTOL-MYERS CO.

Manufacturing Chemists
277-281 Greene Avenue
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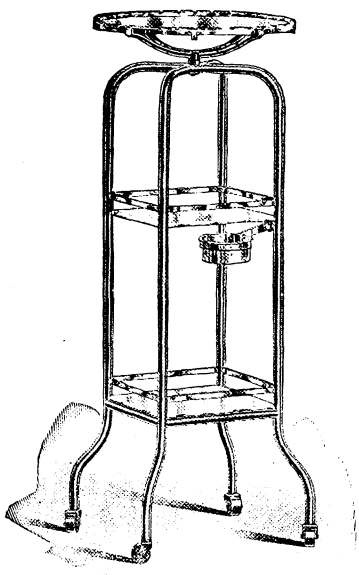
No. 60 Cabinet

A popular Cabinet at a popular price. Note the Colonial design that will look better to you the longer you have it.

Its interior conveniences are fully equal to its exterior attractiveness.

It is fully described in our catalog which we will gladly send if you are interested.



Aseptic Operating Table

Fully as convenient as the ordinary bracket and table and will relieve the window casing or wall of one of its burdens.

It is 40 inches high, has revolving top which is removable, and two white glass shelves below.

Both an ornament and a convenience.

The American Cabinet Co.

Two Rivers, Wisconsin

ESTABLISHED 1865

SAMSON RUBBER

EUGENE DOHERTY

DENTAL RUBBERS

Trade Mark
No. 3788

Registered
June 20, 1876

RETAIL PRICE-LIST

SAMSON RUBBER . . .	Per lb.	5 lb. lots	10 lb. lots	25 lb. lots	50 lb. lots
	$3.50	$3.35	$3.20	$3.10	$3.00

	Per lb.	5 lb. lots	10 lb. lots	25 lb. lots
Pink Rubber, light shade Pink Rubber, medium light shade Pink Rubber, deep shade White Rubber		$5.50	$5.00	$4.50	$4.00

	Per lb.	5 lb. lots	10 lb. lots	20 lb. lots	40 lb. lots
No. 1 Rubber, medium red	$2.95	$2.80	$2.65	$2.40	$2.25
No. 2 Rubber, extra light red	3.25	3.00	2.70	2.60	2.40
Mottled Rubber, light or dark shade					

	Per lb.	5 lb. lots	10 lb. lots	20 lb. lots	40 lb. lots
Para Black Rubber Pure Black Rubber Jet Black Rubber	$3.50	$3.25	$3.10	$3.00	$2.90

	Per lb.	5 lb. lots	10 lb. lots	20 lb. lots	40 lb. lots
Gutta Percha, Pink or White, for Base Plates	$2.90	$2.80	$2.70	$2.60	$2.50

Eugene Doherty's New Hold Fast Maroon Colored Rubber	Per lb.	5 lb. lots	10 lb. lots	25 lb. lots	50 lb. lots
Maroon Rubber, light shade Maroon Rubber White Gutta Percha, in round sticks for Permanent Filling	$3.50	$3.00	$2.90	$2.80	$2.70

	Per lb.	10 lb. lots	25 lb. lots
Red Vulcanizable Gutta Percha for plates	$4.00	$3.75	$3.50
Black Vulcanizable Gutta Percha for plates	4.50	4.25	4.00
Maroon Vulcanizable Gutta Percha for plates	4.25	4.00	3.75
Pink Vulcanizable Gutta Percha for coating purposes	6.50	6.25	6.00

	Per lb.	5 lb. lots	10 lb. lots	25 lb. lots
Deep Orange Rubber	$3.00	$2.80	$2.60	$2.40
20-Minute Rubber for repairing purposes	3.00			
Black or Red Flexible or Palate Rubber for lining plates	3.50			

	Per lb.	5 lb. lots	10 lb. lots	20 lb. lots
NONPAREIL RUBBER	$2.50	$2.35	$2.25	$2.20
New Idea Rubber	3.00	2.65		

	Per yard roll	Per half yard roll
Rubber Dam, medium, 5 and 6 inches wide	$1.75	$0.90
Rubber Dam, thin, 5 and 6 inches wide	1.35	.70

	Per lb.	5 lb. lots	15 lb. lots	20 lb. lots
No. 1 Weighted Rubber for lower plates No. 2 Weighted Rubber for upper and lower plates Black Weighted Rubber for lower plates	$4.00	$3.80	$3.60	$3.30

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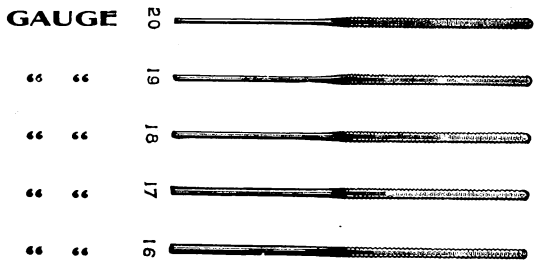
Orthodontia Appliances in Platinum Gold

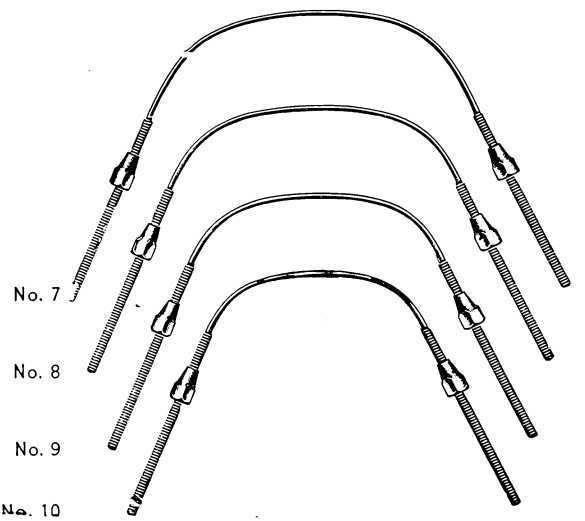
Patented Nov., 1909

Illustrating the different gauges of our Expansion Arches, all having one size thread, flat and smooth on two sides.



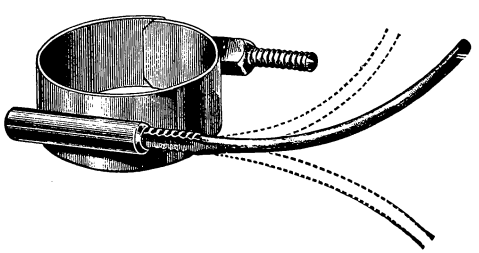
EXPANSION ARCHES

with middle section gauges, 16, 17, 18, 19 and 20 gauge, and in lengths from 4¾ inches down to 3½ inches. All interchangeable and fitting either round or oval buccal tubes.

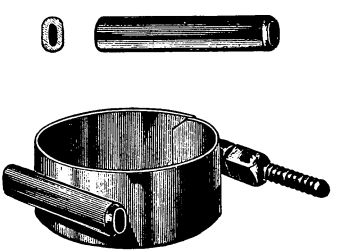


ANCHOR BANDS, ENLARGED (*Double Size*)

With Round Tube for Simple Anchorage



With Oval Tube for Stationary Anchorage



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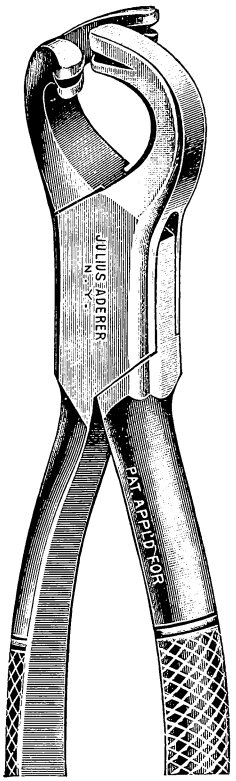
Branches: BROOKLYN—CHICAGO—LOS ANGELES

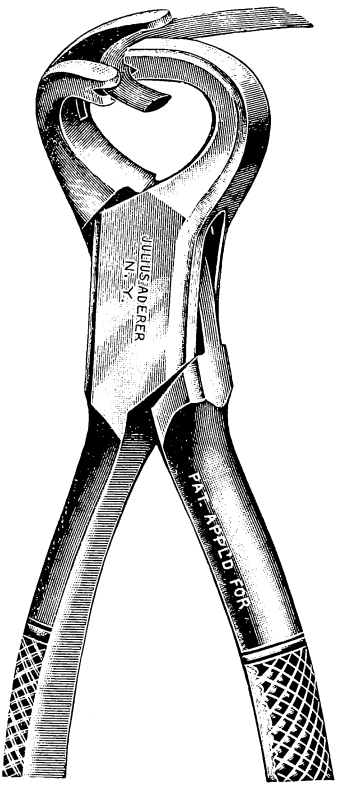


Lingual Bar Bender

CONNECTING a piece of prosthetic work, whether made of gold or rubber, by means of a bar, has been in use for many years although the practice has recently become more general.

The strongest, and yet lightest and least tongue annoying connecting bar, or so called lingual bar, is wire drawn to oval shape instead of round; and the reason the oval wire has not been made use of more frequently is owing to the difficulty of bending same to fit properly.

LINGUAL BAR BENDING PLIERS, above illustrated, will bend oval wire as well as flat or half round wire effectively to the required shape without leaving any marks. The best way to bend wire of this kind to the lingual side of the lower cast is by first making a pattern in paper over the model and exactly in place where the metal bar is to come; straightening the curved paper ribbon will indicate the exact curve the wire is to be bent, which can then be done in a few seconds by the aid of this effective instrument.



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PRICE, $3.00

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Uplifting Prosthetic Dentistry

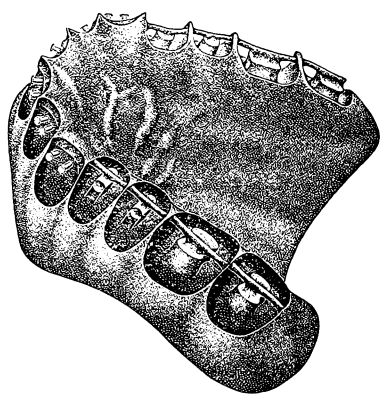
A good many years ago, Josiah Wedgewood, one of the immortals of porcelain art, declared:

> "A competition for cheapness, and not for excellence of workmanship, is the most frequent and certain cause of the rapid decay and entire destruction of arts and manufactures."

The making of porcelain teeth is an art manufacture, the construction of an artificial denture a fine art.

Does anyone seriously believe that the introduction of base-metal pins had any other object than cheapening the manufacture of porcelain teeth? or that their use in artificial dentures can possibly raise the standard of prosthetic dentistry?

Any art must advance or it will decay; there is no standing still.



THE S. S. WHITE "COMBINATION SET"

is a distinct advance in vulcanite artificial work. The attachment of the molars and bicuspids—the teeth which sustain the heavy work of mastication—is a homogeneous part of the plate itself, unbreakable, incorruptible under any conditions of the oral secretions.

S. S. White "Combination Sets" combine beauty and service; they are an uplift to prosthetic work, and their cost should prohibit the use of any merely cheapening product.

Combination Set of 14 ..... $1.78

The S. S. White Dental Mfg. Co.

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Their Perfection Makes Them Helpful

No. 1
No. 2
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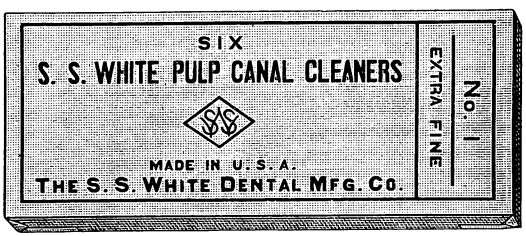
No. 4



Note this fact about the **S. S. White Pulp-Canal Cleaners,**—they point the way to better means for removing pulp débris.

They are spring-tempered, the barbs are evenly cut and uniformly placed in a conical spiral on a round, smooth shaft.

You can depend upon their uniformity in the various sizes, because they are made by automatic machinery throughout, from the testing of the steel to the finishing of the barbs. They are a typical S. S. White product in the perfection of their adaption to their use. You will find them close to the ideal for their work.

Four sizes—No. 1, Extra Fine; No. 2, Fine; No. 3, Medium; No. 4, Large. Put up in half dozens, each size separate, or assorted, three Fine, and one each of the other sizes, in hermetically sealed packages, with tin foil wrapper, protecting the Cleaners against moisture conditions.

$0.50 per half dozen, $5.50 per half gross.

Does All You Ask Of It

You open up many cavities which can't be permanently filled at once—dentin infiltrated with gases from a dead pulp must be treated—and you have to seal it up for a time. You must seal it tight—can't have the oral fluids getting in to cause more mischief—and it's necessary that whatever you use as a seal shall be reasonably easy in application and removal; you may have to repeat several times.

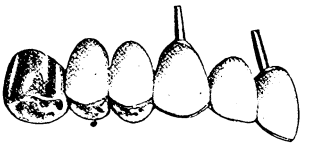
The **S. S. White Temporary Stopping** meets every requirement. It softens at a temperature (145 degrees F.) not too high for the patient's comfort, is readily packed, has an adhesiveness which lets it stick to the walls, and seals the cavity tightly. It will remain as long as needed and when the time comes for its removal the work is not difficult.

Two colors, pink and white, two sizes, ⅛ and 3/16-inch diameter. In boxes containing a full ounce; both sizes, all white, all pink, or assorted.

Price, per 1-ounce box.....$0.40

The S. S. White Dental Mfg. Co.

Philadelphia, New York, Boston, Chicago, Brooklyn, Atlanta, Cincinnati, San Francisco, Oakland, Sacramento, Toronto, Montreal, Berlin, Germany.



IMAGINATION

With the aid of imagination a man can sell cactus, deserts and colored water, college educations, hymn books and patent crackers, tame lions and trained fleas, fountain pens and patents of nobility, chewing gum, corsets and the blue sky and once in awhile PATENT TEETH, but imagination is

NOT REQUIRED

to sell Steele's Interchangeable Teeth, for they are the accepted scientifically correct teeth, adaptable to any case of CROWN, BRIDGE or PLATE WORK.

They do not have to be ground in to fit the ckings after the case is soldered. Teeth and molds can be ch .ged at will. Always firmly seated on backings.

Advice upon practical cases submitted.
Technique upon request.

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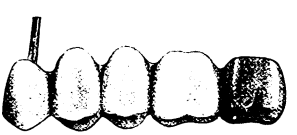

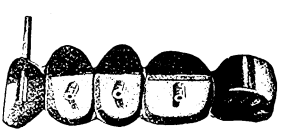

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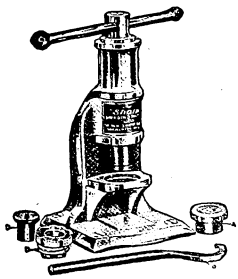
(A practical system for practical men)



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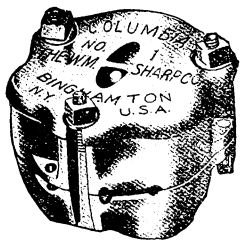

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(Stops the noise of hammering)

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DEPARTMENT OF DENTISTRY

Advantageously located in the city that has a world-wide reputation in this Science. The buildings are centrally located and are modern and complete in every respect.

The Department of Dentistry is an integral part of the Medico-Chirurgical College, and the students enjoy all the privileges accorded to students of the Departments of Medicine, Pharmacy and Pharmaceutic Chemistry. Students of the Department of Dentistry are on an absolute equality with the students of the other departments. Every branch of medical teaching in the College is open to dental students for perfecting themselves in any special direction.

It is believed that the demands for a broader culture and higher attainments in the field of dentistry can best be met by the co-education of medical and dental students in dental departments of medical schools in so far as the curricula of these schools coalesce.

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The most modern equipment is in use in the operating rooms and laboratories. The clinical facilities are unexcelled. The thorough course given in diseases of the mouth and teeth is made practical by the number of dispensary cases, amounting to several thousand each session.

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Infirmary Course
June 8th to September 25th, 1915 (Optional and Free)

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For admission, preliminary educational, curriculum and other requirements write for an announcement

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The Regular Session for the year 1914-15 begins Monday, August 17, 1914, and closes Wednesday, May 12, 1915

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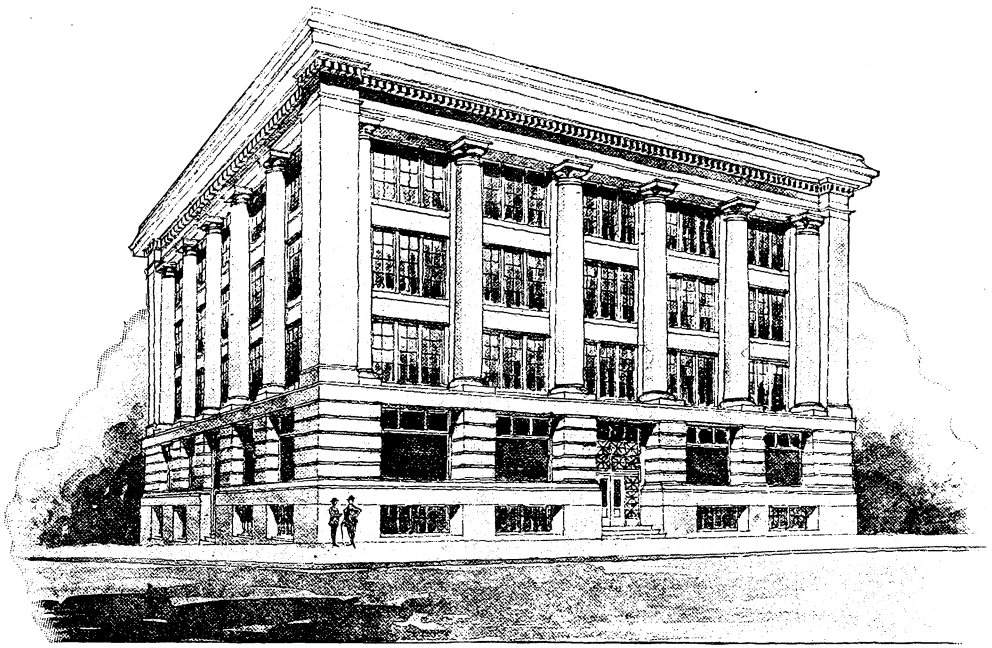
PORTLAND, OREGON



Established in 1898

The object of North Pacific College is the training of young men and women for successful professional careers. It may safely be said that no school in America has better facilities. The rapid advance made by North Pacific College among educational institutions of America is shown by the fact that during the present year 1913-14 no fewer than thirty-three American States are represented in the student body, in addition to several Canadian provinces and nine foreign countries.

The new fire-proof building will accommodate more than eight hundred students. It is one of the best-lighted buildings on the Pacific Coast.

The new hospital for patients requiring oral surgery and work for the correction of deformities is open to the public. Thousands of patients are treated annually in the infirmary and hospital, which offer exceptional opportunities to ambitious students.

The location of the college is close to the heart of the city, convenient to libraries, clubs, large business houses and public buildings, which contribute so much to the life of the student.

The annual session begins October 1st of each year.

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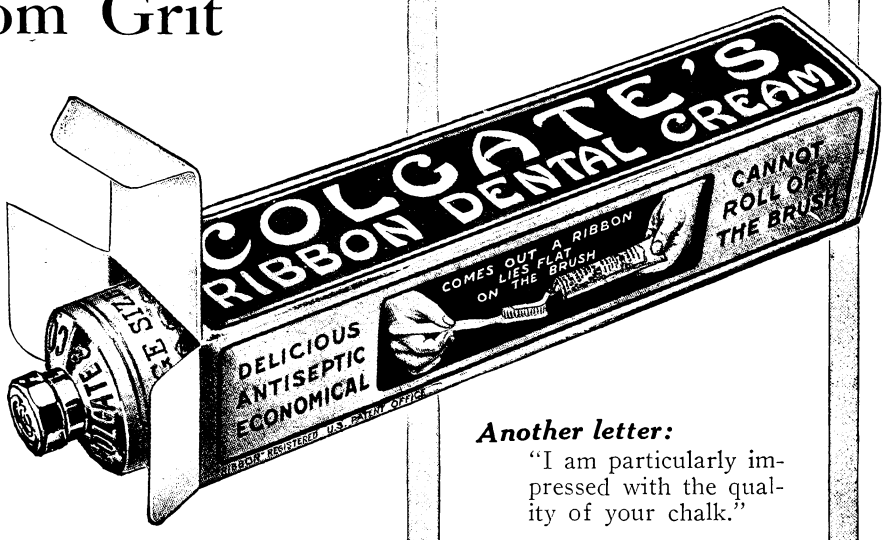
One dentist writes:
"I would certainly not recommend any dentifrice that contained an abrasive of any kind."



Another letter:
"I am particularly impressed with the quality of your chalk."

WE MAKE its chalk base ourselves under chemical and microscopic tests that insure its absolute uniformity. So far as we know, we are the only dentifrice manufacturers who thus make their own chalk base. It is entirely free from harmful silicious matter, yet of sufficient body to fulfil the function of a thorough cleanser and polisher.

Ribbon Dental Cream further merits professional consideration as a dentifrice that is, effectively antiseptic without over-medication, leaving prescription for abnormal oral conditions to the dentist's discretion.

Some members of the profession prefer a dentifrice in powder form. For such, Colgate's Dental Powder will completely solve the vexing problem of safety—it is based on the same chalk as that contained in Ribbon Dental Cream.

Our booklet "Dental Hygiene" should be on your reception room table for your patients to read. We will gladly send 15 copies on request. Also ask for our leaflet "Light on Precipitated Chalks."

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If it could be made any better we would do it, but the great number of prominent dentists who have been using it continuously since it was originated testify that it is the

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Dentists' "Indispensable" Gold Solders

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There is room for legitimate, friendly rivalry. We welcome that type for it keeps us on our mettle. As the late Edward Wescott wrote, in "David Harum," "It's good for a dog to have fleas. Keeps him from broodin." When we observe fleas, it spurs us to even greater activity.

Our claims of superiority are not based *solely* upon this long record. There are *other* reasons, which follow: In addition to our laboratory research, experimenting, latest apparatus, and time-tested developments, we used information from valued customer-friends, based upon results achieved in *their practice* with Ney's Best Since 1812. From their appreciated co-operation and our experience, those products were evolved which made Ney's the World's Standard.

As alloyed by us, the karats used yield *strong* yet *soft-flowing* Solders, absolutely in harmony with the structure and colors of the plates for which they are intended. At the moment when your plate has been heated to that degree which best admits of *perfect joints,* Ney's Best Since 1812 Solder flows freely. *The finished plate is homogeneous.*

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